MINING CONGRESS JOURNAL

DECEMBER 1943

The Season's Greetings

Don't Relax Yet!
The Christmas Season is one of Hope. We are all full of it. But this particular Christmas is one for redoubled efforts—so that the hope which we all have may someday materialize.
At Knox we are working long hours at top speed for victory and lasting peace—and for the time when we can say to you, with some justification—
Here's wishing you a Merry Christmas and Another Year of Success and Satisfaction.
KNOX MANUFACTURING CO.
8th and Cherry Streets, Philadelphia
SINCE 1911 PRODUCERS OF
KNOX
Valves-Couplings-Nipples-Clamps-Menders

MINING CONGRESS JOURNAL

VOLUME 29, NUMBER 12

FOR DECEMBER 1943

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Opinions expressed by authors within these pages are their own, and do not necessarily represent those of the American Mining Congress

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Mechanization will win the war

Mechanization is no longer a dream word—JOY made it into a mighty force, a new powerful force, in the mining and production of the nation's coal—

The whole theory of modern war is based on mechanization—skill in strategy, and courage in battle are, of course, prime essentials—but the tools of war are machines—machines that move and kill and destroy. The proved theory of industry—becomes the proved theory of Mars.

JOY Engineers, men with sound experience in the coal industry, will be glad to counsel with you.

JOY Manufacturing Co.
Franklin, Pa.

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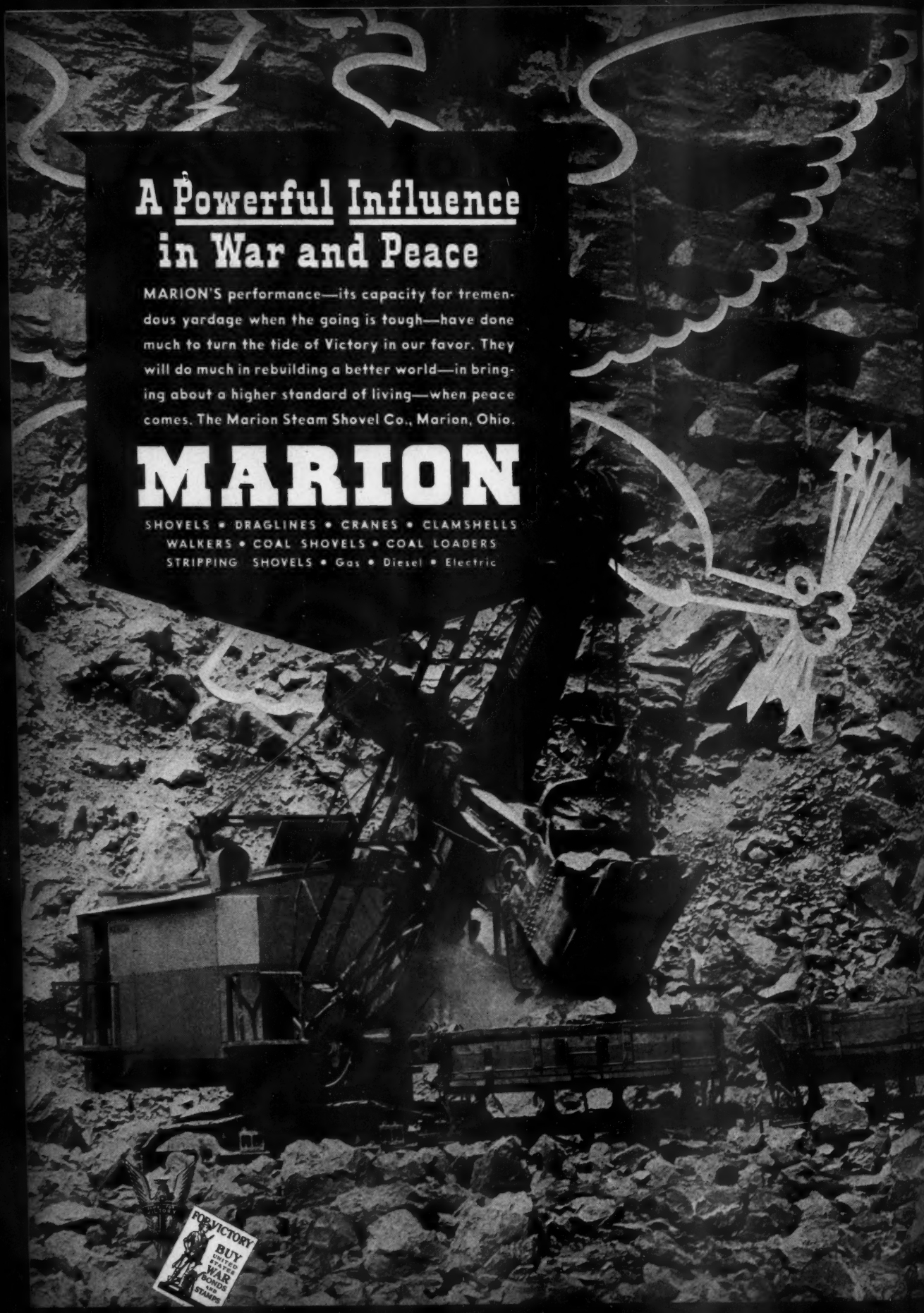
Call in a
Joy Engineer

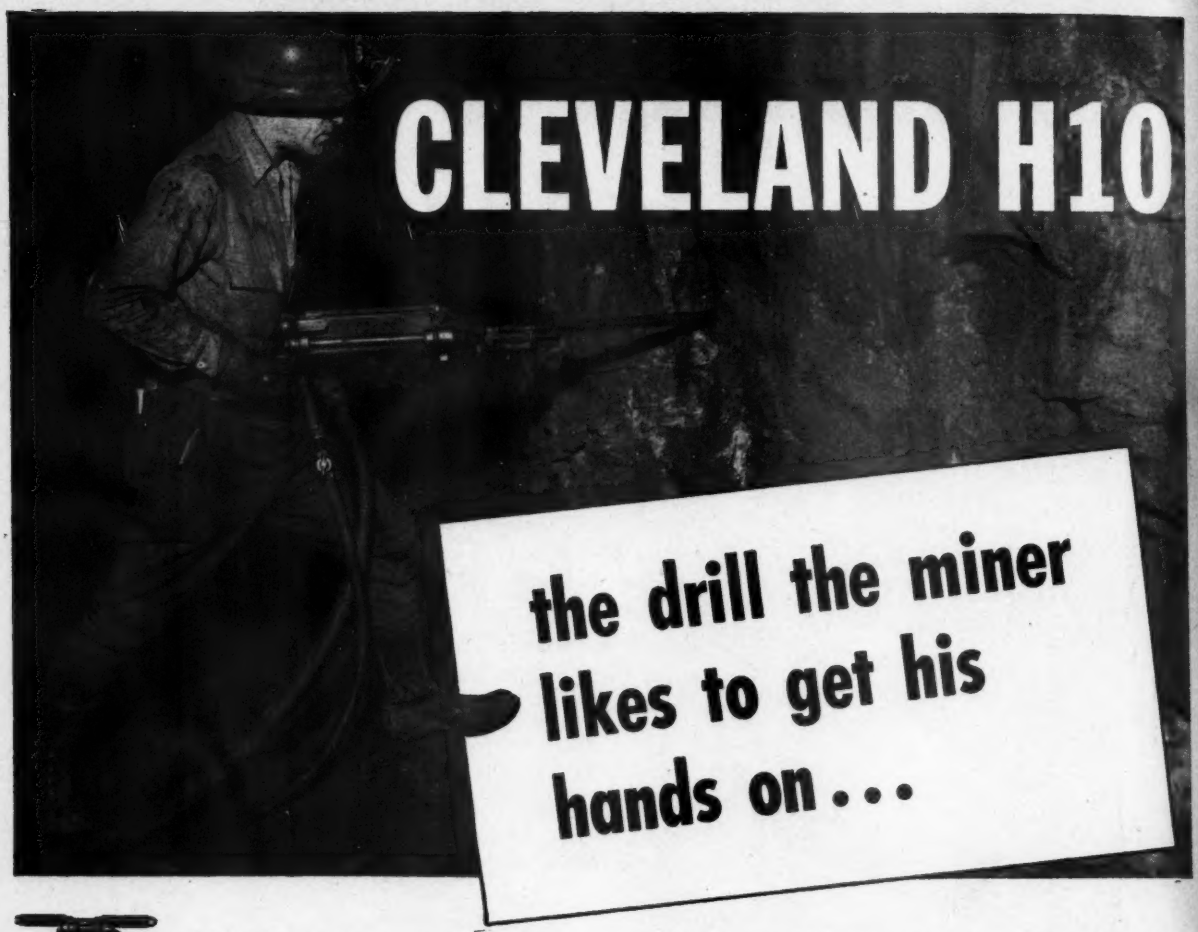

A Powerful Influence
in War and Peace
MARION'S performance—its capacity for tremendous yardage when the going is tough—have done much to turn the tide of Victory in our favor. They will do much in rebuilding a better world—in bringing about a higher standard of living—when peace comes. The Marion Steam Shovel Co., Marion, Ohio.
MARION
SHOVELS • DRAGLINES • CRANES • CLAMSHELLS
WALKERS • COAL SHOVELS • COAL LOADERS
STRIPPING SHOVELS • Gas • Diesel • Electric
FOR VICTORY
BUY
UNITED STATES
WAR
BONDS
AND
STAMPS

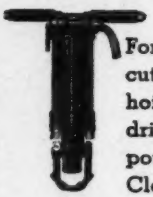
"cheap logs" is *Conservation*

Like the logging camps, the oil fields provide one of the toughest of all power tests . . . but here too, Cummins Diesels have been proved on the job.

In 1936, with the introduction of the Cummins Diesel, the logging industry started on a new era of lower operating costs and added savings in manpower. "Shows" which would have been inaccessible or highly unprofitable became duck soup when Cummins Diesel-powered trucks demonstrated their ability to handle loads of 100 to 200 thousand pounds at an over-all operating cost far below previous transportation figures. The Cummins Diesel-powered yarder was easy to move and the engine's flexibility and torque characteristics, plus its proved economy and direct savings in manpower, soon made it the choice of shrewd loggers.

Today, after seven years' experience with all types of diesels, the Cummins Diesel is the first choice of the loggers in trucks, yarders, loaders and donkeys because it has made "Cheap Logs" a fact. Cummins Diesel power put the logger in a position to deliver more logs at a lower cost . . . this is *real* conservation. CUMMINS ENGINE COMPANY, Columbus, Indiana.





For hand-held drifting, pop-holing, hitch cutting, drilling anchor holes for scraper hoist and haulage lines—in fact, for any drilling around the mine for which the 45-pound, hand-held drill is usually chosen—the Cleveland H10 is a universal favorite. The H10 is easy to hold, and is light enough to be readily supported in any position. Its rotation is strong, and it blows the hole with unfailing certainty.

You will like the H10's rugged durability, its habit of being always underground, where the drilling is done. Its end-seating valve improves with use—there is no increase in air consumption as the drill grows old in service. The efficient lubricating system takes care of even the hard-to-reach points like the flutes of the rifle bar and the forward chuck bearing. H10 is a drill that sticks around the mine a long time—*and it always delivers.*

All the standard chuck sizes are available, as is also a strong, rigid mounting for light drifting. H10 sinkers are obtainable with required priority on surprisingly quick delivery. Fully described in Bulletin 122, and in the new Cleveland catalog, just off the press.

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HALSTED STREET AT 48TH • CHICAGO 9, ILL.

✓ Speed up haulage,
✓ Save man-hours
with Prefabricated Trackwork

Is slow haulage, caused by too many derailments, or too much time out for emergency trackwork repairs, holding back your Victory tonnages?

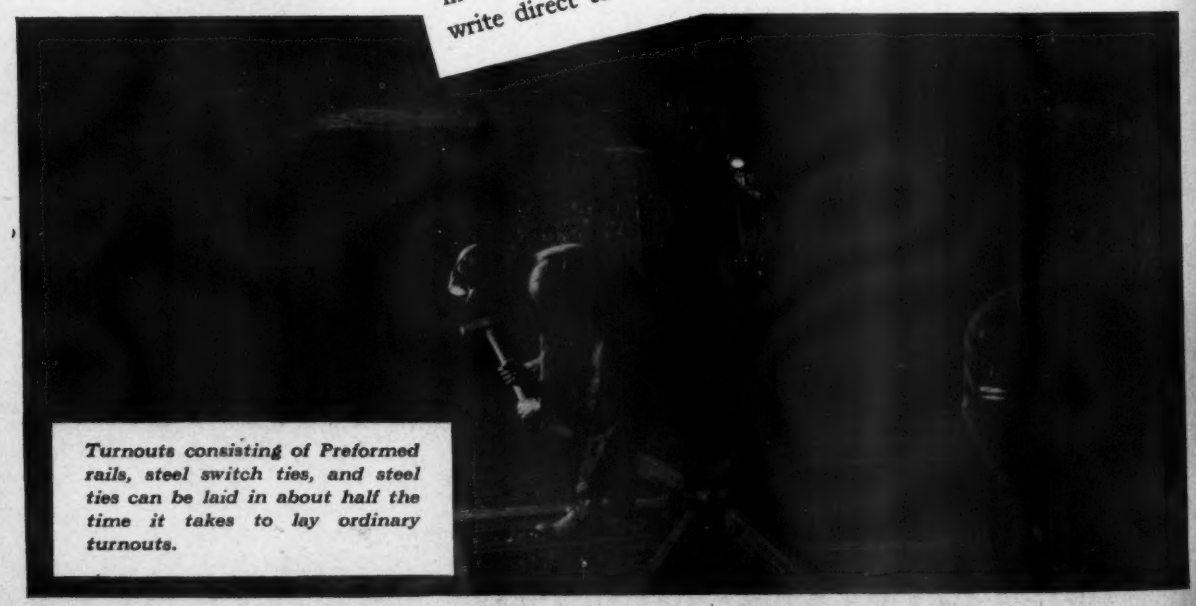
Bethlehem has a new cure for these ailments—Prefabricated Trackwork.

You no longer need to cut, bend, curve and fabricate trackwork at your mine. You can simply check over your needs with a Bethlehem engineer, and the work will be done accurately and at minimum cost in Bethlehem's shops.

This "packaged" trackwork will speed up your haulage system—save man-hours in laying track and making repairs—and save you needless headaches in facing fabrication problems.

After it's delivered to your mine, "packaged" track can be handled by relatively unskilled track layers—an advantage in these days when experienced men are scarce. For more detailed information about prefabricated track work get in touch with the nearest Bethlehem representative, or write direct to Bethlehem Steel Company, Bethlehem, Pa.

BETHLEHEM STEEL



Turnouts consisting of Preformed rails, steel switch ties, and steel ties can be laid in about half the time it takes to lay ordinary turnouts.

9 Factors Affecting the Life of Wire Rope *(Continued)*

(This is number 18 in a series of articles prepared by Macwhyte Wire Rope Company for the benefit of wire rope users everywhere. All articles in this series are yours for the asking. Macwhyte Engineering Experience is available on specific problems.)

★ ★ ★

In the previous article of this series, the first four of nine factors affecting wire rope life or service were discussed. They were:

1. *Abrasion or Wear*
2. *Bending or Flexing*
3. *Tension or Stress*
4. *Speed*

As the article pointed out, these four can be kept from doing too much harm (to rope and machine) by frequent checkups.

While some of the four factors mentioned above are normal and to be expected, there are five other "rope saboteurs" which are *not* normal. These can be corrected. They are:

5. *Crushing or Mashing*
6. *Weathering or Corrosion*
7. *Jerking or Shock*
8. *Vibration*
9. *Heat or Friction*

What can you do to correct them, and thus save steel and time now so urgently needed? Here are specific suggestions.

Crushing or Mashing

Improper winding (criss-crossing) on the sheaves or drums results in crushing or mashing. It *pays* to start the rope winding properly. Keep it from criss-crossing and reduce scuffing against the flanges of the drum and against the under layer to a minimum.

Where rope is loose on the ground (on incline slopes especially) it pays to prevent trucks or equipment from running over the rope. Lubricate rollers, sheaves, and guides so as to avoid undue abrasion. When rope jumps a sheave, stop and replace it before continuing the operation.

Permanent injury to the rope and damage to equipment can result if a rope is operated while out of its proper sheaves. In clamping or fastening the end of the rope use care to avoid needless damage.

Weathering or Corrosion

Wire rope is made of high carbon steel wire and will rust and corrode if not properly protected by a suitable lubricant, especially if it is not in constant use. Proper lubrication keeps the rope flexible and reduces wear as well as affording a protection against corrosion. (See article 10 in this series.)

Jerking or Shock

If there is slack in a rope, take it up slowly before the load is applied. This is where the human element enters the picture. Many a rope is ruined for lack of care on the part of the operator. A quick pickup with as little as 12 inches of slack will more than double the load on the rope and may cause it to snap. Even if the rope doesn't break immediately, it is weakened and breaks later in normal operation. (See article 15.)

Vibration

Vibration of wire rope in service fatigues the steel wires and consequently "tires" them out before they wear out. It is difficult to correct this except where this vibration is caused by faulty equipment and hurried handling. A clutch or brake may chatter and this vibration is multiplied many times throughout the length of the rope. Vibration may cause rope to break where it is dead ended (fastened). Where wire rope is fastened in a socket, continuous vibration will cause the wires to break right at the socket—cutting off a short section and refastening is a cure for this. A smooth pickup and steady operation will do much to eliminate vibration.

Heat or Friction

Heat changes the structure of steel. In general, it hardens it or makes it more brittle. Friction creates heat. Lubrication helps reduce friction. A stuck roller, a poorly aligned sheave, scuffing against wraps of rope on a drum, scraping on rock or metal creates friction and heat. Wire rope must be kept free to do its job of bending. Heat and friction will change its steel composition and cause it to break up prematurely. Where ropes travel at high speed, watch out for the effects of heat.

Not EVERY Enemy is found on the battlefront. Look...

Killed through Carelessness. Literally chewed to death, this rope was ruined before showing any normal wear.

Unnecessary Abrasion. A hoist rope was allowed to saw through a heavy plate. Such waste can and should be avoided.

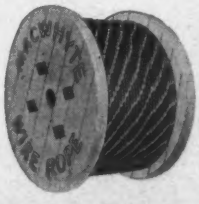
Mashed to Death. Criss-crossed on the drum, this rope gave only a fraction of the service it might have, had more care been used in spooling.

Why Such Waste? This rope has been cutting a number of grooves in the bucket rim. It will give poor service and increase operating costs.

Your Wire Rope Requirements

The benefit of years of experience based upon servicing equipment similar to yours is gladly given. When you ask Macwhyte for suggestions and recommendations, you can be assured not only of getting "The Correct Rope for Your Equipment," but also a personal interest in helping *you* get the most out of *your* rope.

Feel free to consult with Macwhyte distributors, Mill Depots representatives, or write to Macwhyte Company direct.



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UNITED STATES

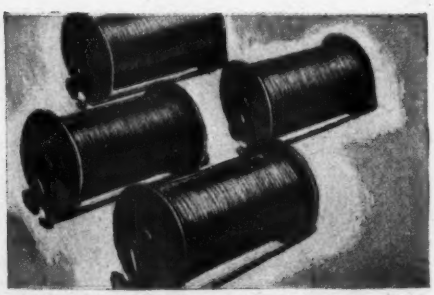
Miles from nowhere —but the message gets through

He'd crawled, run, crawled again. Now he was far ahead of his company... into enemy territory... surrounded... cut off completely from American forces except for a strand of lightweight wire... Laytex Assault Wire.

But his messages got through surely and clearly... made possible a successful advance.

Laytex Assault Wire is made expressly for jobs like this. It's extremely lightweight... yet tough enough to be used by advance scouts.

The use of such lightweight small diameter wire is possible only because the insulation is of such high quality—has high resistance to moisture, withstands a wide range of temperature changes and does not become embrittled when subjected to vibration and shock. Laytex Assault Wire has a talking distance of over five miles.



LIGHTWEIGHT Laytex Assault Wire weighs only thirty pounds per mile. This means that an advance scout can carry ample wire while pushing ahead.

SPECIALLY DEVELOPED for front line service, Laytex Assault Wire is hard at work in Europe, Asia, the South Pacific.

LAYTEX ASSAULT WIRE is unaffected by moisture or temperature changes because of the high quality of the insulation. This means it can be laid and used successfully regardless of climate or terrain.

FIVE MILES LONG—but messages get through clearly. Laytex Assault Wire, tested and retested for quality, has a proven talking distance of more than five miles.

RUBBER COMPANY

Satisfied users have bought

MORE THAN 3,750,000,000 DU PONT BLASTING CAPS

WHY? Because these caps are dependable. They're time-tested. For almost half a century, blasters everywhere have relied upon Du Pont Blasting Caps and have found them 100% satisfactory. Years of Du Pont "know-how" and the most modern equipment and testing devices known to science are combined to assure the user of blasting caps that are always dependable.

Today, Du Pont Blasting Caps are packed in a new, improved safety box. The caps are packed in horizontal rows so that the open ends are protected from grit, sparks and drops of water. This reduces the possibility of misfires due to wet caps and lessens the chance of accidental detonation. In addition, the caps are more easily, more quickly removed from the box.

Remember . . . the most dependable detonator is the safest detonator. E. I. du Pont de Nemours & Co. (Inc.), Explosives Department, Wilmington, Del.

DU PONT BLASTING CAPS

DU PONT

REG. U.S. PAT. OFF.

Artist's conception of the new Link-Belt blending, sizing and washing plant for Alabama By-Products Corp.

5 Point Preparation Program for Southern Operator

With the completion of this Link-Belt designed and equipped preparation plant now under construction, Alabama By-Products Corp., Birmingham, will attain 5 major objectives—

(1) Greater uniformity of coking coal through high efficiency washing and blending of raw coal from various working faces in three mines.

(2) Greater flexibility and maximum economy in operation between mining and preparation shifts.

(3) Economical disposal of mine rock, picked refuse and washery rejects.

(4) Economy in the use of water accomplished through the closed water circuit of the Link-Belt air-pulsated washing system and clarification of the washery water.

(5) Lowest possible amount of connected horse power for operation and highest production per man hour.

In addition to the Link-Belt air-pulsated washery, a Link-Belt rotary car dumper, blending bins, belt conveyors, shaking screens, elevators and other Link-Belt preparation and handling units are employed. Let us send you further data on this and other recent Link-Belt preparation plants.

LINK-BELT COMPANY

Chicago 9, Philadelphia 40, Pittsburgh 19, Wilkes-Barre, Huntington, W. Va., Denver 2, Kansas City 6, Mo., Cleveland 13, Indianapolis 6, Detroit 4, St. Louis 1, Seattle 4, Toronto 8, Vancouver

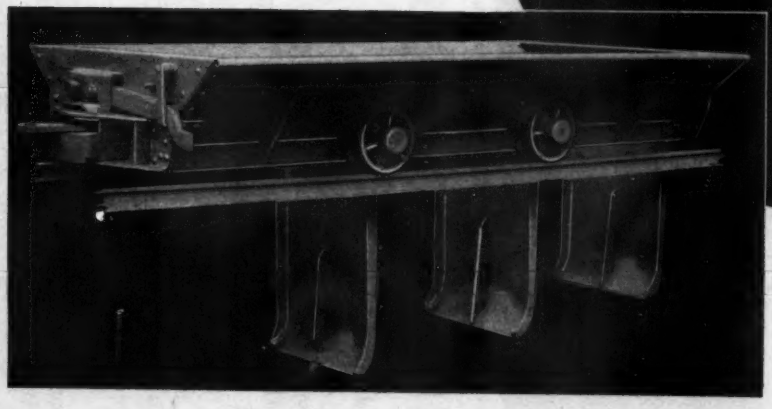
2148

LINK-BELT COAL PREPARATION EQUIPMENT

Now S-D "Automatics" May Be Unlatched ELECTRICALLY--

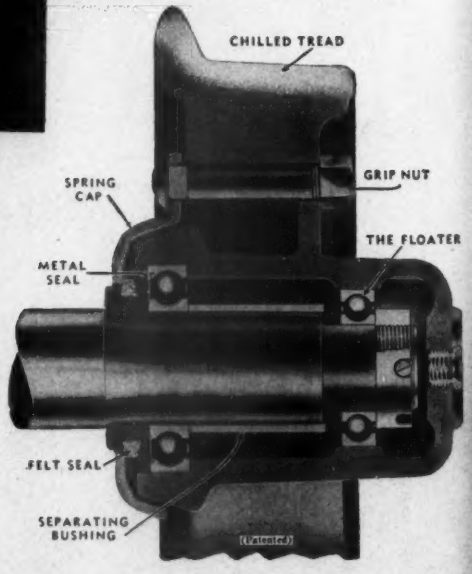
★ Sanford-Day has been recognized for years as the leader in their field because they always keep ahead of the parade with worthwhile improvements for the production of coal. One of our latest developments is the S-D Electrical Door Unlatching Mechanism.

These pictures tell the story. Shown at right is a picture of the latch-end of an S-D "Automatic" mine car which has our new, automatic, electrically operated, unlatching device. This car has no latch lever and nothing projecting beyond car. It is the last word in streamlining the method of discharging cars, and its operation is extremely simple. Below we show a car with the regular unlatching mechanism for dropping doors. This new electric device represents another Sanford-Day accomplishment, for which we continually strive to more and more reduce the cost of coal production. And every time you purchase S-D mine cars you will find in them some new improvement in design or method which reduces the cost of producing coal.



• When the car equipped with the electric unlatching device arrives at the dumping bin, contact is made simply and safely and in such fashion as to complete an electric circuit which actuates the solenoid and causes the doors to be released for falling. The doors are released instantly and they discharge the coal in the usual 1-2-3 "Automatic" manner. Doors close in the usual way also. The electric power comes from the same source as that which supplies the power for operating other mine equipment.

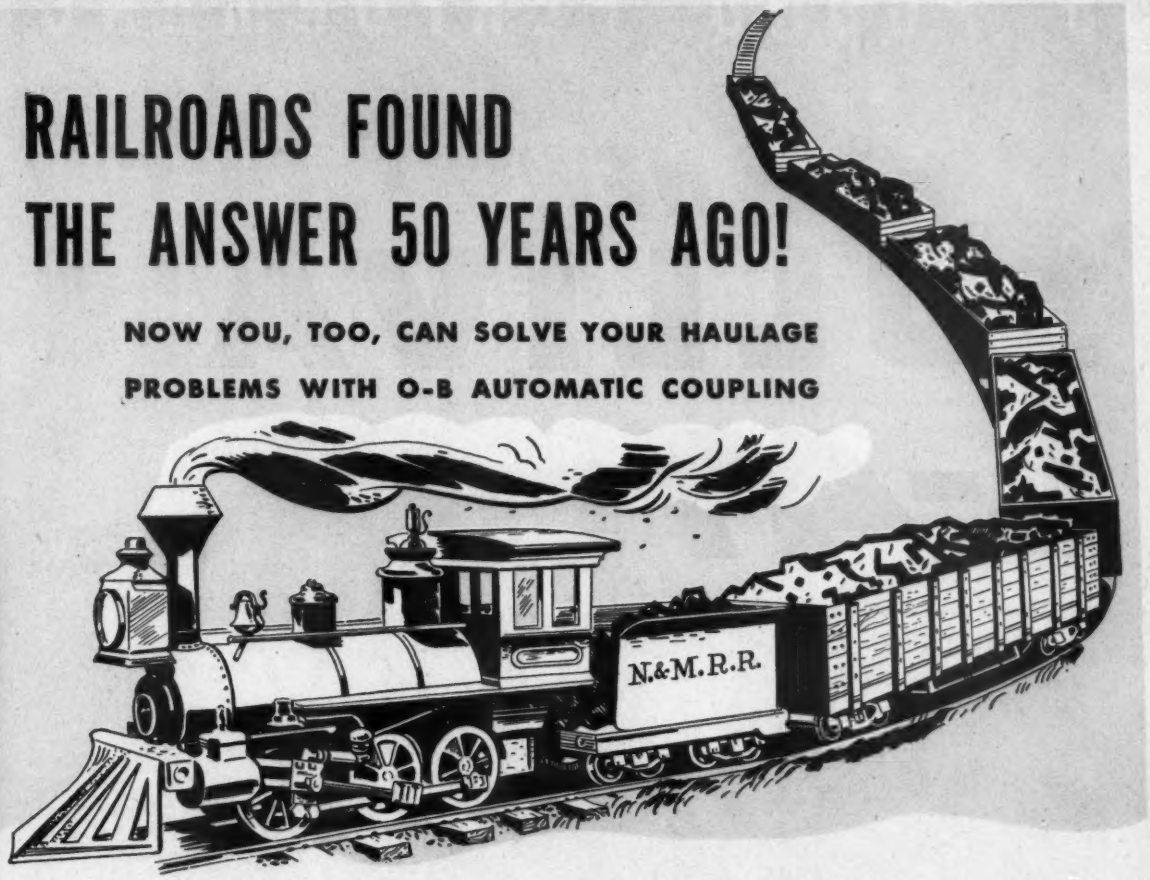
With S-D 1-2-3 "Automatics" . . . with this new foolproof type of unlatching device . . . with the S-D "Floater" Ball Bearing Wheel, we offer you the most modern and, definitely, the greatest money saving cars available. Let one of our representatives give you complete details of this equipment. Drop us a line now!



Sanford-Day Iron Works, KNOXVILLE, TENNESSEE

RAILROADS FOUND THE ANSWER 50 YEARS AGO!

NOW YOU, TOO, CAN SOLVE YOUR HAULAGE PROBLEMS WITH O-B AUTOMATIC COUPLING



LAGGING TONNAGE FLOW?

Coupling upon impact speeds loading, gathering and dumping operations.

EXCESSIVE MAINTENANCE?

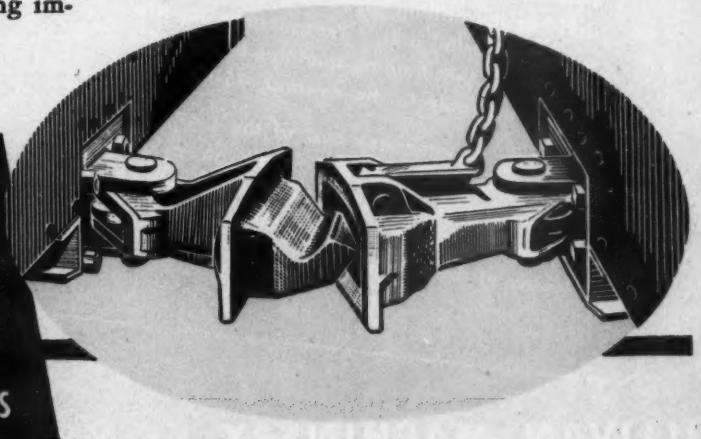
Elimination of dead slack stops damaging impacts to cars; fewer time-outs for repair.

COAL-STREWN HAULAGE WAYS?

Smooth couplered-operation prevents undue spillage; cars stay full from face to tipple.

HIGH HAULAGE ACCIDENT RATE?

Automatic couplers lessen haulage hazards; no need to go between cars to manipulate outmoded hitchings.



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Ohio Brass

MANSFIELD, OHIO

Canadian Ohio Brass Co., Ltd., Niagara Falls, Ont.

KEEP BUYING WAR BONDS

WRITE FOR BOOKLET 676-AM

55 POUND PERFORMANCE

with this easy-holding drill in the 45 lb. class

the NEW

SULLIVAN L-47

Wet, Blower or Dry Type
Standard Chuck ⅞" x 3¼"
Size Air Hose ¾"

Field reports for the past year have consistently indicated that the Sullivan L-47 rock drill has the drilling speed and power of the average 55-lb. drill. These same reports emphasize that holding qualities of the L-47 are comparable to the average 35-lb. drill.

The low maintenance cost of the L-47 has been proved again and again in actual service. Design and construction are similar to the Sullivan L-57, long the outstanding leader of the 55-lb. class.

EQUIPPED WITH THE

DUAL VALVE

SULLIVAN MACHINERY COMPANY, MICHIGAN CITY, INDIANA

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Manufacturers of: Hand Held Rock Drills • Wagon Drills • Drifters • Detachable Bits • Spaders • Paving Breakers • Plug Drills • Portable and Stationary Air Compressors • Utility Hoists • Contractors Hoists • Scraper Haulers • Loaders • Core Drills • Contract Core Drilling • Oil Well Drills • Coal Cutters

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and in Principal Cities Throughout the World

★ A TALE OF THE SEA FOR USERS OF MINE LOCOMOTIVES AND SHUTTLE CARS ★

HOW A RETIRED BATTERY SPED A SHIP TO WAR

It is 5:00 p.m. on a wartime Friday at a West coast port. Tomorrow at 10:00 a.m. a ship with a cargo of war materials is scheduled to sail.

Suddenly it is discovered that a standby storage battery is required and that until one is obtained the ship cannot sail. In their emergency, the ship operators phoned a local Edison engineer. Could a new alkaline battery be supplied from local stock? It could not. Then what could be done? "Perhaps," the Edison Engineer suggested, "our marine distributor could lend you a battery made up of used cells, until the new one can be shipped from our factory."

"See if they can," was the reply.

They could. They rounded up old but still serviceable cells; charged them during the night, and by 5:00 a.m. had assembled them into a battery and installed the battery on the ship. At 8:00 a.m. the official inspectors tested it and pronounced it satisfactory in every way. At 10:00 a.m. the ship sailed—on schedule. In normal times, this would not be considered good battery engineering. But that is not the moral of the narrative. The moral is that Edison Alkaline Batteries, even after they are old and perhaps no longer capable of delivering full rated capacity, nevertheless provide highly dependable service.

This quality, always available, is proving especially valuable in wartime . . . in the locomotives that are hauling coal and ore from the working places of American mines . . . in the industrial trucks that are handling materials in the war industries and the distribution depots of our armed forces . . . in the carlighting and signal systems of American railroads . . . in military uses where battery failure would be intolerable.

Some of the characteristics which account for this extra reserve of dependability in an Edison Alkaline Battery are cited in the column at left.

ADVANTAGES OF THE EDISON ALKALINE BATTERY IN MINE LOCOMOTIVES AND SHUTTLE CARS

★ It is durable mechanically. High strength steel construction is used in the container, grids, pole pieces, etc. The electrolyte is a preservative of steel.

★ It is foolproof electrically. It may be short-circuited, over-charged, over-discharged, or even accidentally charged in the reverse direction without injury.

★ It can be charged rapidly. It may be charged at full normal rate throughout the entire length of charge. It requires no equalizing.

★ It withstands temperature extremes. It is not damaged by freezing. Free air spaces on all sides of all cells provide ventilation for rapid cooling under high temperature conditions.

★ It is free from ordinary battery troubles. It is not subject to sulphation, shedding of active material, buckling of plates, jar breakage or other common causes of battery failure.

★ It does not require critical adjustment of charge rates. It can be charged directly from the d-c mine power supply. It has no finish-rate limitations.

★ It is simple to maintain. Merely charge adequately, add pure water, keep clean and dry.

★ Its tray assembly and cell connections are extremely simple.

★ Its life is so long that its annual depreciation is less than that of any other type of storage battery.

EDISON STORAGE BATTERY DIVISION, THOMAS A. EDISON, INCORPORATED, WEST ORANGE, NEW JERSEY

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ALKALINE BATTERIES

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AT YEAR'S END, it is fitting that we mining manufacturers express to mine operators throughout the country our deep appreciation of the cordial and cooperative business relationships existent in this great industry.

As members of the Manufacturers Division of the American Mining Congress, which was reorganized in 1942 to afford a medium for our active support of the Congress during the war years when no mining expositions may be held, we enjoy the opportunity of cooperating with mine operators in the national organization of the combined mining industries of the United States.

We have faith in the mining industry—and are vitally interested in its welfare and its continued development. Our functon is one of service. We pledge every effort in support of war production during this crucial period, and look forward to the time when our full facilities may be turned to even greater steps than heretofore realized in the modernization progress of all mining operations.

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Progress for Coal

UNSELFISHLY devoting time for a number of years to problems of research for the benefit of the bituminous coal industry and the users of coal, Howard N. Eavenson, dean of American coal engineers, has now brought forth a research program calling for a minimum expenditure of $500,000 annually for five years.

As president of Bituminous Coal Research, Inc., Mr. Eavenson and a skilled staff are leading the way to a better post-war world for coal in the development of smokeless stoves, automatic residential heating, and year-round air conditioning of residences; in utilization of coal in the metallurgical and ceramic industries; in design of over-fire air jets; in the use of pulverized coal in locomotives, and in internal combustion engines; in large-scale gasification of coal, and in solving acid water and roof problems in mine operation. Arrangements are being made with a number of laboratories and industrial plants to carry on with necessary phases of the program, and it is announced that there are several projects which have reached a stage where research work has ended and commercial development should begin.

At long last it now appears that the industry is launched on a program that will enable it to hold its own in the competitive market of the post-war era.

Vigilance Required

FOR MORE than ten years a campaign of increasing intensity has been developing in the Department of Interior to change the statutes providing for location and entry of mineral deposits on the public domain and to enact in their place a leasing law which will cover precious, base and strategic metals as well as the other minerals on the Federal lands which are not now specifically placed in the mineral leasing law. The drive to repeal the long-standing mining laws has been evidenced in recent years by pronouncements contained in the annual report of the Secretary of Interior and in testimony which he has presented to Congress, and now we have what many regard as the opening bill on legislation designed to accomplish this objective, in the bill introduced —"by request"—by Senator Carl A. Hatch of New Mexico. This measure, while primarily regulating the holders of placer mining claims for deposits of phosphate, sodium, potassium, oil, oil shale, or gas, carries in its Section 4 the initiation of a practice new to the powers now exercised by the Department.

This Section provides that "notwithstanding the filing of any statement required by this Act, the validity or existence of the claim to which such statement relates shall remain open to inquiry and determination *upon such procedure as may be prescribed by the Secretary of the Interior, or in any other lawful proceedings.*" This is obviously too broad and indefinite a grant of authority. To obviate the danger of such language remaining in this bill and perhaps spreading to other legislation affecting the mining laws, an amendment is now on file with the Senate Committee on Public Lands and Surveys under which this Section would read: "notwithstanding the filing of any statement required by this Act, the validity or existence of the claim to which such statement relates shall remain open to inquiry and determination *by the Secretary of the Interior under the same procedure and in the same manner as other mining locations or claims.*"

The Secretary of the Interior testifying in July, 1941, before a Senate Public Lands Subcommittee investigating with respect to the development of the mineral resources of the public lands, recommended that amendments to the mining laws should be made (a) to broaden the coverage of the mineral leasing principle as opposed to the system of lode and placer claims, (b) to require the recording of outstanding mining claims in the General Land Office and to require annual reports of assessment work on such claims, and (c) to bring lands acquired by the various Federal Government agencies under the same mining laws as govern lands of the public domain.

At this same hearing, Vice President Donald A. Callahan of the American Mining Congress, in making direct reply to Ickes' recommendation, stated categorically that "the laws relating to the location, appropriation, and operation of mining claims have worked. They should not be disturbed. The system should not be distorted."

The recent withdrawal of three million acres of public domain in Utah, now under investigation by a Senate Public Lands Subcommittee, is but another instance of these continuing encroachments.

At the American Mining Congress Western Division meeting, October, 1941, the mining men of the country took action in the following declaration:

> "We commend the long-established system of discovery, location and patent, by which development of minerals in public lands has been encouraged and facilitated. We oppose extension of the leasing system to other minerals than those now covered thereby.
>
> "The laws relating to the location, appropriation and operation of mining claims have worked. They should not be disturbed.
>
> "No further national parks or other reservation should be dedicated by law or proclamation whereby mineral resources of importance would be closed to location and development."

As now written, the Hatch bill may well be the camel's nose, from a legislative angle, of these persistent efforts to strike from the statute the mining laws adopted by the Congress of the United States out of the full and thoroughly practical experience of the mining men and their Senators and Congressmen who in their far-seeing wisdom have brought forth and are continuing to bring forth the mineral wealth of this country.

Training Programs In Mechanized Mining

Properly applied training programs tend to secure greater efficiency, reduce costs and lighten the burden of operation. Mr. Jones outlines the general scope of training programs in mechanized mining, with emphasis on specific features which have been used successfully.

By D. C. JONES

Supervisor of Mining Extension
The Pennsylvania State College

I WISH to clear up, first of all, any questions regarding the justification for such training work. You may wonder why there should be a distinction made between a program of training in principles of mechanized mining and one of the vocational type such as has been offered in this and other states for many years under the generally recognized name of "night mining school." The latter type of training is essentially one in which miners can acquire that information which will enable them to pass the examinations offered by the Department of Mines of their particular state and thus secure a certificate which will permit them to act in a supervisory capacity inside of coal mines. A well-designed night mining class program should also provide those who attend with a general mining knowledge and with specific information which will enable them to discharge their duties as a mine supervisor in a proper manner. Training in mechanized mining principles and practices, while closely allied with vocational mining classwork in principle, is more intense in its application, or it is designed to provide training in practical knowledge of specific jobs for those men engaged in such work. It can be varied in its application so as to train new men who have recently been employed, or to train experienced men to do a better job, or to train certified supervisors in better methods of handling equipment and men. It should be recognized, then, that mechanized mining training programs differ from that work offered in night mining classes of the vocational type in both purpose and application, and this justifies its existence as a separate type of training program.

Presented to the Monongahela Valley Coal Mining Institute, Morgantown, W. Va., November 9, 1943.

Type of Employe to Be Trained

Having decided that a training program is desirable for one or more of your mines, the next consideration is the type of workman to be given the training. This will depend on the particular difficulties which you have experienced in the operation of your equipment. If you have a maintenance force which is sufficiently large to repair and overhaul your equipment, but they are inexperienced with regard to this new equipment which you have recently installed, then a program designed to acquaint them with both mechanical and electrical maintenance procedure is indicated. If you lack sufficient trained maintenance men, this same program might be enlarged so as to provide training for new men who could be used to supplement the efforts of the more experienced mechanics. Again, the search for a way to reduce machine breakdowns and lower maintenance costs may indicate the need for a training program for those men who operate the equipment, with emphasis on proper handling and minor adjustments and repairs.

Bosses, and especially those whose experience in this capacity was largely under hand-loading conditions, should not be neglected in the consideration of those who should be trained, for much of the responsibility for proper application of mechanized mining equipment falls on the shoulders of the supervisory force, and the superior results obtained where this type of employe has been given special training indicates the value of such work. It is possible that specialized training for particular groups of workmen may be replaced by a general upgrading program of training for which all of the mine employes would be eligible. It is evident that the situation at each mine or group of mines will determine the type of workmen to be trained.

Selection of Personnel to Be Trained

Having decided on the particular group of workmen to be trained, your next decision will be on whether those men to be given this training work should be selected by management or whether the opportunity to take the work should be thrown open to the entire group. This decision is frequently necessary where the size of the group is so large that acceptance of the majority would provide a training class too large for the training facilities available. One advantage in selecting the men to be trained, whether this selection is made by a company official or by some competitive test method, is that men can be chosen who are recognized as of higher caliber and thus more capable of absorbing the information given them in class and of using it in their daily work in the mine. Another advantage, especially where the choice is made by a company official, is the inclusion in the training class of those men who possess an excellent background of mining experience and who might develop into good bosses, yet who would not of their

Vocational instruction makes these men more efficient

own free will make any move toward attending the classes.

On the other hand, the selective choice of students frequently antagonizes some of those who were not selected, and this attitude may be reflected in their daily work or in their future relations with the company. Unrestricted admittance, provided the training facilities are capable of taking care of all who indicate their intention of attending classes, offers the advantage that those younger men who are ambitious and anxious to gain a firmer foothold in the mine organization are quite willing to work and study hard, and this may produce the type of person which the mine organization can use to best advantage. Also, unrestricted admittance or attendance of their own free will on the part of the mine employes does not create the attitude that the company owes the students a better job or special privileges because of their attendance, and this attitude is frequently present where the training group is made up of selected students.

If a company resorts to compulsion in any form to have their men attend such training classes, they may be liable for payment to the men for the time spent on such training, whereas non-compulsory attendance at a training class conducted by some agency such as the state university constitutes a free effort on the part of the student and he cannot hold the company liable for payment for the time spent in class. These are questions which are extremely important, and they must be considered whenever a company decides to institute training programs for its employes.

Aptitude Tests for Students

Several years ago we included aptitude tests of prospective students as part of the preliminary work in setting up training programs in mechanized mining. It was our hope at the time to be able to classify the employes at any particular mine as to their abilities with respect to operation or maintenance of mining equipment, or to supervision of mining work employing such equipment, so as to assist the mine operator in determining whether he had the right men in the right jobs. The results of the tests were quite startling, and very satisfactory from a technical viewpoint, but we have discontinued their use as a required part of our training programs for reasons which will be given later.

There are many different types of aptitude tests which may be given, each designed to reveal certain qualities or inherent traits in the person being tested. We used a battery of three tests, each of which was chosen for its relation to certain traits which we felt should predominate in persons who deal with machinery.

The first test determined "mental alertness," or the ability to reason out the answer to problems or situations. This test was limited in time so as to provide a basis for distinguishing between those who were extremely quick in their mental reactions and those who were quite slow. A person who has had considerable previous schooling will have an advantage over a person who has had only five or six years of schooling because of his better reading ability, so it is natural that the higher grades in this first test should go in most cases to those persons with the greater amount of education.

The second test, which was also limited in time, indicated the "mechanical aptitude" of the person tested. Previous schooling had some influence on the test results, but a natural aptitude for machinery was of greater importance in obtaining a high score.

The third test, which was not timed, could have been scored to show several different traits, but we chose the trait of "emotional stability" as being most important, and test results were based on this one trait. Unlike the first two tests, this third one had no right or wrong answers, only indications of the way the person being tested felt about his work, his home life, his associates, etc. A high rating in the first two tests indicated a high degree of intelligence and an excellent understanding of machine principles. Men engaged in repairing equipment generally made good scores in the second test, but it was also true that many who never had a wrench in their hands showed a high degree of understanding of machine principles as indicated by good scores. The third test indicated whether the person tested was emotionally stable or whether under trying circumstances he would lose control of his emotions and, as they say around the mines, would "blow up." We thought that a certain degree of emotional stability was a very desirable trait for those men who must work with mechanized mining equipment.

Tests Discontinued

Our decision to discontinue the use of the aptitude tests in connection with our mechanized mining training program, except where the company sponsoring the program made a definite request for them, was based on several reasons. First, the test scores on employes with considerable experience in that company could be verified in the majority of cases through personal knowledge of company officials, and in such cases the tests merely supplied additional information and were not absolutely essential. Second, persons with low test scores are frequently deferred to a later period in the training work, especially where the number of persons with high scores is sufficient to fill the training facilities, and we were unwilling to place a barrier in the path of any low-scoring individual who might be spurred to exceptional effort if he were grouped with others having greater natural talents.

A third reason for our lack of desire to assume the responsibility for the testing of the prospective students is the discontent which frequently develops among those who are deferred to a later training period because of low test scores, and we felt that the good resulting from the aptitude tests might be more than offset by the strained relations between the men and the coal company as a result of this discontent. If the company sponsoring the training work feels that these reasons are not important in comparison with the value of the test results, then we are quite willing to give the tests and discuss the results with the company officials.

College education can not be given in vocational schools

Contents of Mechanized Mining Training Programs

The type of material to be covered in any training program in mechanized mining should depend on the particular group to be trained and also on the goal to be reached through such training. It would be possible to design a training program to cover the entire field of mechanized mining, and then offer this to every group with the idea that all of the information was valuable, regardless of whether much of it applied to the conditions in the mine where the training was given or whether individuals in the group would be able to use all of this information. Complete coverage of present-day practice in mechanized mining would require considerable time, and I doubt whether individuals would be benefited to any extent by compelling them to study equipment and methods with which they might possibly never have contact.

I believe that the best interests of the individuals, and of the mine organization also, are served most completely when the training program provides each individual with that specific information which he can use either immediately in the course of his employment or sometime in the near future. Some distinction should be made between the different types of workmen in the same mine, for it is evident that machine operators need not be trained as thoroughly as mechanics in the principles of operation and maintenance of equipment, and supervisors should receive instructions on control operations which might not be of particular value to either the operators or maintenance men. Some of the training work will undoubtedly overlap, as where bosses would be given the same instruction on operation and maintenance as would be given to operators, but in my opinion each group should be provided with a training program designed for its particular needs.

Four Courses Suggested

I would like to offer for your consideration, then, a program of training in mechanized mining principles and practices which consists of four courses. The first course, which will be called "preparatory work," consists of studies in mathematics, applications of mechanical principles, and applications of strength of materials, with a definite relation between these studies and the equipment used in the particular mine where the men are employed. The second course, known as the "mechanical maintenance" course, consists of studies of the equipment used by the company in its mine or mines, with emphasis on the construction, use, proper operation, and proper mechanical maintenance or repair of this equipment. The third course, which is designated as the "electrical maintenance" course, consists of a study of the electrical portions of the equipment referred to in the second course, with emphasis on the fundamental principles of electricity, wiring diagrams of machine controls, approved trouble-shooting methods, and factors affecting the permissibility features where such are used. The fourth course, termed the "supervisor's" course, consists of studies on approved supervisory methods as applied to the particular type of mining employed by the company. Using these four basic courses, I believe it is possible to design a training program which will provide the needed instruction for any particular group of workmen employed by a coal company.

Trained motor crews increase production

For example, suppose a company is interested in upgrading its present group of mechanics in the principles of electrical maintenance, and as an after-thought it wishes to have some other mine workers who have shown some inclination toward maintenance work included in the training group. The training program would include the first or "preparatory" course and the third or "electrical maintenance" course. Provided the necessary training facilities and a capable instructor are supplied, these men could be upgraded to a remarkable degree over a period varying from three to six months, depending on the amount of time the company wished to spend on the training period. If the problem was one of reduction in equipment breakdowns, and training in the better use and maintenance of equipment was desired, a program consisting of the second or "machine maintenance" course would be offered to the operators of equipment, using the particular machines which the different operators handled.

Bosses could be included with the machine operators in this training work, for I contend that the supervisor in a mechanized mining section can be of great help in obtaining proper machine operation, but only if he has been trained also in what constitutes good operation and maintenance. A complete training program for bosses would include all four of the courses previously described, with equal emphasis on each of the courses. It is possible to operate mechanized mining sections where the boss has little or no knowledge of the equipment under his charge, but I believe that a higher degree of supervision will be obtained where those men who act in a supervisory capacity have received training in this four-course program or in one similar to it.

Administration of a Central Training School

The type of material provided the training groups is very important, but the manner in which this instruction is given is equally as important if worthwhile results are to be obtained. In this connection we must consider whether the training work will be conducted solely for the employes of one company or whether employes of several companies will be grouped together in the training classes. Each type of application has certain advantages and disadvantages, and each has certain administrative problems which together with local conditions may decide which type of application will be used.

Personally, I would prefer to have the training program in mechanized mining administered in a centrally located center with shop and classroom facilities to which employes from a number of mines in the vicinity could travel for instruction. The advantages of such a training center would include

the use of trained instructors, for through constant repetition of the courses these instructors would develop their teaching technique to a high degree. Also, the necessity for training men from a number of mines using different kinds of equipment would make it necessary to have sufficient machines for study so that these men could secure either a course of study on their own type of equipment or a well-rounded course of instruction on all types of machines. There would likewise be less interference with the classwork than where instruction is given in a part of some mine repair shop where normal repair work on equipment is being carried on at the same time.

There would also be a certain amount of prestige attached to being trained in a mechanized mining school of this type, so that men who have successfully passed all of the required work would influence others from their mine to apply for admission, and training work could thus be carried on for a number of years in the same location. With adequate training facilities and a staff of trained instructors, the courses of instruction could be made flexible enough to either upgrade mine employes with considerable experience in their particular jobs or provide complete training for men with little or no experience in mechanized mining work.

On the other hand a centrally located training school requires a populous mining area if it is to remain in operation for any number of years. In areas where there are few mines, or where the small number of men employed in the mines makes it uneconomical to establish such a training center because of its short life, the application of a training program under the sponsorship of one company appears to be more satisfactory. No doubt, the matter of classroom and shop facilities for a training center would not be a difficult problem to solve, for in most populous mining areas there are usually several coal companies that can provide such facilities, either in unused buildings or in parts of their normally used shops, without too much interference with their regular maintenance program. The question of equipment for the training center could probably be solved by having the coal companies in the vicinity loan such equipment, while supplies such as tape and wire could be purchased by the administrative head of the training center and resold to the students. Other details, such as tuition fees, text material, rental for the training facilities, cost of power and heat, and payment of instructional expense would have to be worked out for each location.

The numerous administrative details incident to the establishment and operation of such a training center would undoubtedly require the appointment of an administrative head. If the center operated on an evening schedule, this administrative head could be a regular employe of some coal company during the day, but if both day and evening classes are held, then the person acting as administrator would have to be a full-time employe of the training center or of one of the organizations connected with its operation. It should be evident that this type of application of a mechanized mining training program will require the strong support of some local organization, possibly a mining institute, or a group of mining companies, in cooperation with the educational institution which directs the activities of the training center. Where such cooperation and support is available, and where the local conditions warrant such an educational program, the establishment of a training center can be of inestimable value to both the men and the companies in that locality.

Administration of a Company School

The company-sponsored training program differs from the training-center work in that all persons admitted to the classes are employes of that company, or it is a "closed" proposition. It has the advantage that training can be supplied to the workmen in any mine, regardless of its size, for the facilities and equipment which are used for normal mining and maintenance operations at that mine can also be used for training the men. Companies which operate mines in less populous areas are thus able to secure training for their men which would otherwise not be available if they depended on a training center. Another advantage of this type of program is the intimate relation which can be obtained between the training work and the mine work, for it is usually necessary, and also desirable, to use company employes as instructors, and their knowledge of mine conditions, machine troubles, etc., can be used to good advantage in the training work. Also, classes can be scheduled at the mine so as to minimize the difficulties of alternate shift work, such as having a day-time session just prior to the start of the afternoon shift, and scheduling the evening class for the day shift so the night shift men can also attend it before starting work.

One of the outstanding advantages is the possibility of providing training for practically the entire working force of a mine within a short time by having classes for each type of workman carried on at the same time. Where the mine employs a large number of men, it may be necessary to divide some of the groups into several training sections, but where adequate training facilities and capable instructors are available, a complete program of training for one mine can be carried out within 12 to 24 months. I will leave it to your imagination to visualize the impact of a properly coordinated mine-wide training program on the operation and maintenance of the equipment in that mine.

I do not wish to give you the impression that the company-sponsored type of program is trouble-free, for there are a number of difficulties to be overcome in applying it successfully. In the first place, the company officials must be educated to the value of the work and the necessity of giving it their whole-hearted support, for where this support is lacking the training work will fail miserably. Using the mine facilities for training will naturally result in conflicts, both for men and equipment, so it is necessary to have some person from the company act as a coordinator to schedule the men for classwork according to their normal working shifts, to secure the necessary equipment for study at the proper time, and to smooth out other difficulties which might arise.

A major problem is the securing of qualified men to act as instructors, and it is frequently necessary to draft a master mechanic or a production foreman or an engineer to act as instructors, thus adding to the normal work load which they have been carrying. As a rule these men are quite capable in their normal jobs, but teaching requires a technique just like any other profession, so that class instruction sometimes stumbles along for a while and then reaches its maximum quality just as the training program closes. Where the company limits the size of the group to be trained and then spreads the program over an extended period of time so as to train several groups, the men acting as instructors naturally improve their instruction methods to a point where their work becomes quite satisfactory, and this applies also where a company repeats a training program after one one or two years lapse and the same men act as instructors.

Company-sponsored training programs, then, should prove of value for the mining industry in areas where a training center has not been established or cannot be established because local conditions do not appear favorable. One defect of this type of work is the limiting of class admission to those who are employed by the sponsoring company. This disadvantage might be avoided by combining employes of two or more mines in a program of training at one of the mines, utilizing the facilities and equipment of the company operating that mine, and thus secure results approaching those of the centrally located training center previously described.

There is some advantage in the company-sponsored type of program in that administrative details are kept to a minimum, equipment and mate-

rials can be secured without too much red tape, and there are no worries about power and heat charges or rental for housing facilities. The sponsoring company usually takes care of all expenses in connection with the training program, excepting that of text material which is purchased by each student, so the cost to the workmen is kept at a minimum.

It is possible that training programs are or have been conducted on plans which are a modification of either of the two foregoing types. Regardless of the manner in which the training work is conducted, satisfactory results will be obtained only when proper classroom and shop facilities are provided, when instruction given is definitely along the line of work normally followed by the students, when the instructors are men qualified by training and experience to command the respect of the students, and when the training work receives the wholehearted support of the officials of the company or companies affected.

Company Attitudes Toward Training Programs

I have made frequent references in this paper to the necessity for wholehearted cooperation on the part of the officials of the company or companies which sponsor training programs in mechanized mining. This emphasis should not be taken to mean that company officials are usually negligent in this respect, for it has been my experience that they are extremely cordial in their attitude toward any educational program which will be of benefit to their employes. Mere cordiality, however, is not enough. There must be strong, active support of the training work, and this applies to either the training-center type or the closed-proposition, company-sponsored type of program.

In the training center type of school, the companies should take an active part in the planning of the program, in the furnishing of training facilities and training equipment, and in encouraging their employes to take some or all of the training courses offered. A board of control for each center to be comprised of one official from each company involved, could work with the educational institution which directs the training and thus coordinate the work of the center with the type of mining and equipment used in the various mines of these companies. A lesser quality of cooperation is hardly acceptable, for this will mean that the entire burden of the training work will be carried by the educational institution directing the program, and no training agency exists which can produce high-grade results when the companies which are being served are apathetic toward such training.

Cooperation in the organizing and carrying out of a training program is most desirable, but companies should go even further than this. There should be some definite effort made to place those men who have completed their training in the type of work for which they are best fitted or for which they show the greatest aptitude so their abilities can be utilized to the greatest advantage in the mining program of each company. Employes will naturally try to use some of the ideas they received in their training work, provided they are encouraged to do so, but where such encouragement is lacking, or where the mine officials definitely discourage any attempt to improve methods because this is a departure from established practice, then all of the good resulting from the training work will soon be lost. Mine officials should recognize that training of their employes in the principles and practices of mechanical and electrical maintenance of equipment, or in improved methods of mining, can be a definite asset to the company, but a proper attitude on the part of the company management is necessary if worthwhile results are to be secured.

Men must be taught how to take air samples

Benefits to Be Derived from Training Programs

What can the management of a coal company expect in the way of benfits where some or all of their employes have been given training in mechanized mining principles? Let me say, first of all, that it will be surprising if the benefits to be derived from such training can be evaluated on a dollar-and-cents basis. The results of educational programs are frequently intangible, yet such training can be the keystone on which management can build smoother, more efficient operation of their mines.

As a rule, executives expect immediate and perhaps startling results from the training work, and when these results are not obtained they decide that a continuance would be wasted effort. Training a few individuals will certainly not produce a marked change in the mine operation, especially when the bulk of the mine employes have not been trained. Again, it is unreasonable to expect that the training of a large percentage of the employes at any one mine will produce immediate dividends in higher production or lowered costs, for the successful employment of trained personnel requires that they be properly directed in their work if satisfactory mine-wide performance is to be obtained. If sufficient attention is given to the proper utilization of this trained personnel, and this means a definite plan for their direction, then improved operation can be expected after a certain length of time. This period may be three months, or six months, or it may be even longer, depending on how directly the training work applies to the mine work

Training programs should be viewed on a long-range basis. If we are to mine coal with expensive, complicated machinery, then it is reasonable to expect that the best results from the use of such equipment will be obtained when the individual who will direct, handle and maintain such equipment are trained for their jobs. Coal companies, then, who recognize this basic principle of good operation, and who plan on the training of their employes until every man who is connected in any way with this equipment has been trained to do his specific job better, will be repaid many times for the effort expended. I view such training work as a most essential step in the modernization of the coal industry of our country.

Government Possession and Control of Coal Mines

In an address before the Annual Conference of the Coal Division of American Mining Congress, Mr. Potter discussed problems of Government operation and pledged aid of the Coal Mines Administration in matters of manpower, equipment and materials.

By C. J. POTTER

Deputy Solid Fuels Administrator and Deputy Coal Mines Administrator

WERE I to have addressed you a year ago today I should have begun by observing that a good job was being done in meeting unprecedented wartime coal requirements.

We were sailing smoothly then, still in comparatively untroubled waters. Although you were experiencing some difficulties with manpower and equipment shortages, and had to keep an eye on distribution so that the steel and by-products plants would have sufficient tonnage of the particular coals they require, you were meeting current requirements in a reassuring manner. And, although you were yet working only five days per week, you had piled up over 90,000,000 tons of bituminous coal in users' stocks, under the program instituted by the Solid Fuels Coordinator for War.

This stockpile is the life preserver which is keeping our heads above water in the present emergency. Without it, the losses of production attending the prolonged wage controversy would have visited disaster upon the coal supply, with grave consequences to the war program.

Mines Taken Over to Protect Wartime Fuel Supply

The inadequacy of the coal supply to withstand a prolonged cessation of mining was obvious last May, when the President first seized the mines in an effort to keep them in production. Although we had over 78,000,000 tons of bituminous coal in users' hands, it was not evenly distributed. Many essential war plants and other consumers had very little supply above current receipts and we were faced with expanding coal requirements on the one hand and diminishing availability of manpower and materials on the other, as we still are today.

When the Government took possession of them for a second time on November 1 there could be no doubt in anybody's mind that we had reached the point where the nation could stand no further loss of coal production whatsoever without jeopardizing the strength of the military forces that depend upon American industry for arms and supplies and endangering the health of the public.

When our wartime fuel supply is in grave danger there is no alternative but for the Government to take positive action to protect the nation.

The details of the November 1 seizure of the mines were similar in all essential respects to those of the May 1 takeover. The first action of the Secretary of the Interior was to issue an order taking blanket possession of all coal mines producing 50 tons or more per day, and all rail-connected mines regardless of their size. The seizure included all real and personal property, franchises, rights, facilities, funds and other assets used in connection with the operation of such mines.

The president, or chief executive, of each mine was designated as the operating manager for the United States. The Secretary's order specified that unless advice to the contrary was received within 10 days the mine officer would be deemed to have accepted such designation.

The operating managers were directed to fly the flag of the United States at each mine and to display a poster, supplied by the Department of the Interior, proclaiming the seizure.

They were authorized and directed to operate the mines under their jurisdiction in accordance with the regulations issued in connection with the previous takeover, and such further regulations as may be issued, and to do all things necessary and appropriate for maintaining operations and the production, distribution, and sale of coal.

Most of you are familiar with these regulations, but I should like to recall to you their statement of the purpose of Government operation, which reads as follows:

"The primary object of Government intervention in the operation of the said properties is the maintenance of full production of coal for the effective prosecution of the war. All duties and authorities set forth in these regulations are to be construed in the light of this purpose, and if any regulation interferes with the accomplishment of this purpose, prompt application must be made to the Coal Mines Administrator to secure the waiver or modification of such regulation."

The plan and policy of operation was stated as follows:

"Control of the operations of the coal mines will be exercised by the Government to the extent necessary to maintain maximum production. Wherever the cooperation of the company and its personnel can be secured, the existing organization of the mining company will be utilized and the company will continue operation in the regular course of business as a going enterprise, conforming with such directions as the Government may issue. Where the prompt and effective cooperation of a company cannot be secured, appropriate action will be taken under section 30 and 31 of these regulations.

"All properties in the possession of the Government shall be operated in

a manner consistent with the fact that title to the properties remains in the owner thereof and that the Government, having temporarily taken possession or custody, will assert only such rights as are necessary to accomplish the national purpose of continued and maximum production."

This underlying policy applies to the present period of Government possession and control with equal force and effect as it did to the first one. And the regulations, as modified by Amendments Nos. 1 and 2, apply to current operations in all other respects, save for the fact that the execution of new instruments of certification and agreement will be in order and, of course, new instruments Nos. 1 or 2 will be called for upon the release of mines from Government possession.

The Executive Order of the President placed upon the Secretary of the Interior the responsibility for exercising any degree of supervision over mine operations that may be necessary to accomplish the purpose of the seizure. The degree to which the Coal Mines Administration will increase its supervision over actual mine operations will depend upon what it will be necessary to do in order to obtain and maintain full production. Heretofore this supervision has been nominal, as you all know well.

Safety a Prime Consideration Under Government Control

Secretary Ickes already has placed operating managers on notice that there must be an immediate improvement in the industry's safety record, and that so long as the mines are in the possession of the Government he intends to see that every possible step is taken to assure maximum safety in operations.

On November 24 he announced that he was reestablishing the Health and Safety Division of the Coal Mines Administration. The safety program contemplates expansion of the coal mines inspection force of the Bureau of Mines and closer check on the manner in which the mines carry out safety recommendations made on the basis of mine inspections and adherence to safety laws.

The same administrative decentralization that marked the first take-over has been carried out in the second. The duties and responsibilities of the regional managers and the Federal operating managers remain unchanged. The same is true with respect to the regional advisory councils, whose previous membership continues under the present organization.

Financial Responsibility Under Federal Possession

Also, I am sure that the industry understands the position of the Secretary of the Interior with respect to financial responsibility under Government possession and control. I should like to quote for you the provisions of the regulations applicable thereto, as follows:

"No operating manager for the United States of any mining company is authorized or shall be regarded as having authority, express or implied, to bind or impose any liability on the United States or any of its officials or agents in the absence of a specific direction or order by the Administrator to that effect. Nor shall any operations of any mine property in the possession and control of the Government, or the proceeds, earnings or liabilities of such mine property in any event be, or be regarded as being, for the account or at the risk or expense of the Government except as a specific written direction or order to that effect shall have been given by the Administrator."

The difficulties with respect to obtaining full production of coal in the absence of a wage contract during the previous period of Government possession and control are well known. Although production during the period that followed the last of the series of three general strikes last spring was maintained at around the 12,000,000 tons per week mark, the rate was never brought up to the higher production that had been attained earlier in the year.

Sporadic stoppages following the failure of collective bargaining machinery to settle local grievances expeditiously in many instances, disagreements over rates of pay and conditions of work, lowered mine worker morale, general confusion and other conditions attending the lack of a wage contract were major obstacles in the path of attaining full production.

Ickes Authorized to Make Wage Contract

In connection with the issuance of the Executive Order under which the present seizure of the mines was carried out, the President stated, and I quote him:

"Because I appreciate the desire of the miners to work under a contract, I have authorized the Secretary of the Interior to enter into collective bargaining contracts with representatives of the miners to govern the terms and conditions of employment during the period of Government operation. Such contracts will be made in accordance with the recent opinion of the National War Labor Board and will be subject to its approval in accordance with the provision of the War Labor Disputes Act."

On November 2, immediately after effecting the take-over of the mines, the Secretary of the Interior began negotiations with representatives of the United Mine Workers of America for a new wage agreement as directed by the President. Late in the day on November 3 an agreement was reached and a memorandum thereof, signed by Secretary Ickes and President John L. Lewis, of the United Mine Workers, was transmitted to the War Labor Board. . On the same evening the International Policy Committee of the miners' union notified the membership of the union that a satisfactory agreement had been reached and instructed all members of the organization who were idle to resume the production of coal at the earliest possible moment.

The interpretation approved by the War Labor Board allows a rate of $1 per hour for the full 8 hours productive time and a rate of 66⅔ cents per hour for 45 minutes travel time for the first 40 hours of the week. This provides for a compensation of $8 per day for productive time under 40 hours and 50 cents per day for the 45 minutes travel time. For productive time after the fortieth hour of the week the rate approved was $1.50, and for 45 minutes travel time it was $1 per hour.

This method of computation was embodied in the instructions sent out to all operating managers of bituminous coal mines. The same principle was embodied in the instructions for computing the earnings of inside tonnage and pieceworkers. The approved interpretation of the memorandum of agreement results in an average total weekly wage of $57.0625.

By now you are all thoroughly familiar with the memorandum of agreement and with the interpretation which the War Labor Board has approved for its application to all classes of labor in the bituminous coal mines.

On November 5 the War Labor Board notified the Secretary of the Interior that it had approved the memorandum of agreement, subject to clarification and resubmission as to provisions for payment of tonnage or pieceworkers and the application of the provision pertaining to pushing cars, and had transmitted it to the President in accordance with the War Labor Disputes Act. The Board's action was approved by the President on November 12.

Immediately upon being notified of the Board's action on the memorandum of agreement we initiated conferences with representatives of the operators and the mine workers in connection with the drafting of the interpretations required under the War Labor Board's order. This turned out to be a considerably more difficult undertaking than the arrival at the original agreement.

Sixteen-Year Production Peak Reached in Mid-November

I am sure that you all have seen the statistics showing that an estimated production of 12,700,000 tons

of bituminous coal—the highest for any week in the past 16 years—was reported for the week of November 20, the first full week of operations under the new wage agreement. In connection with this, Secretary Ickes stated publicly that the sudden and comparatively large increase in production strongly bore out his frequent assertion that a contract with the miners would remove one of the major obstacles which have blocked full production.

But I think we all well know that we must have a still higher rate of output and maintain it over a long period of time if we are to get our coal supply back on a satisfactory basis again.

A studied effort was made to state the instructions for applying the new wage agreement in a clear, concise manner that would eliminate any doubt as to their meaning. They should eliminate any confusion as to rates of pay and working conditions in the bituminous coal industry under the new agreement.

After concluding the wage agreement for Government operations, the Secretary of the Interior immediately took steps looking toward expediting the restoration of the mines to private management under normal operating conditions that would promote full production.

The Government is extremely desirous of terminating its possession and control of the mines at the earliest possible date. Even under the best possible circumstances, it would be difficult, if not impossible, to realize under Government possession the full efficiency of production that the mines might attain under private management with normal operating conditions and an industry-wide wage contract.

Producers Summoned to Wage Conference

With this objective in view, Secretary Ickes invited 29 representatives of outstanding bituminous and anthracite producing companies to meet with him in Washington on November 15.

At this meeting the Secretary made a statement to these men which included the following:

"The President's order and the War Labor Disputes Act provide that the Government restore the possession of the mines to the owners when the productive efficiency which prevailed in those mines prior to the taking over by the Government has been restored. If the operators were to negotiate a contract with the mine workers and the repetition of the work stoppages were thus rendered improbable, it would seem clear that the Government could immediately turn back the mines. I doubt, however, that I would be permitted by this coal-hungry nation to terminate Government possession when many citizens feel that this would again result in the probability that, once the mines got back into the hands of their owners, widespread stoppages would occur again.

--U. S. BUREAU OF MINES

"I have often said, as some of you operators have insisted to me, that the only way in which the coal troubles of the nation can be settled is by the execution of a firm contract between the operators and the mine workers. Nothing has happened to change that opinion. I still feel that that is the only sensible course which will assure settled conditions in the coal fields. The sooner the operators and the mine workers negotiate a contract and the sooner the mines are returned to the operators the sooner you will make happier men of yourselves and of me."

Following that meeting several conferences between the operators and the mine workers were held and negotiations were started in earnest on Monday, November 22, following the War Labor Board's final action on Saturday, November 20, with respect to the interpretation of the memorandum of agreement.

Upon being notified by the Bituminous Joint Wage Conference that certain producers and associations, for reasons unknown to that body, had so far declined or refused to participate in the deliberations, the Secretary of the Interior on November 24 telegraphed the absentees to join the conference without further loss of time.

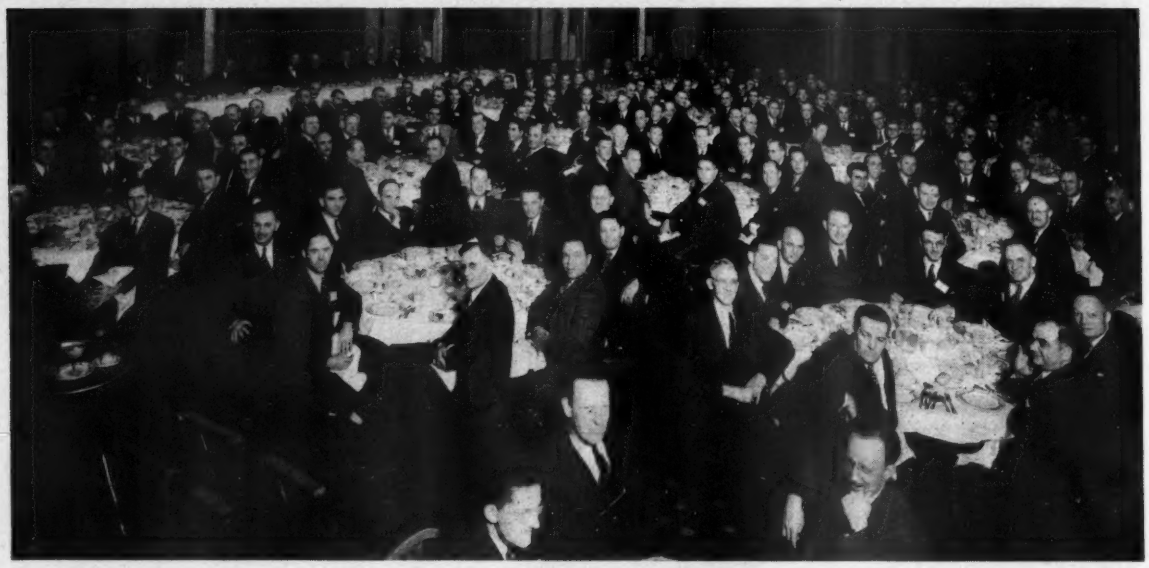
As a result of this action producers representing substantially every section of the nation joined the conference during the first part of this week. About three-fourths of the nation's tonnage subsequently agreed to sit down with the miners and negotiate a wage agreement within the framework of the existing contract between the mine workers and the Government.

We are hopeful that these efforts will bear quick fruits and speed the day when the mines can be returned to private management.

Ickes Desires Return Mines to Owners

I have already expressed to you the desire of the Secretary of the Interior to return the mines to private possession at the earliest possible date. On November 19 he announced that he had returned those of 43 bituminous coal companies upon being advised that no strikes or stoppages had occurred in them since October 25, and that none are threatened. Everything possible will be done by Secretary Ickes and the Coal Mines Administration to expedite the creation of conditions under which all of them can be returned to you.

The Secretary of the Interior told



Annual dinner, 1943 Coal Division Conference

the representatives of the mine owners at the conference on November 15 that his wish was that the mines might be run by their regular operators in their own right. He said that when he joyfully put the mines back into the industry's lap he hoped that they would stay put. I should like to read you an excerpt from the statement he made at that meeting which pointedly sums up his feelings with respect to this matter:

"You gentlemen know that I did not ask for the job of running the mines for the Government when on May 1 the President imposed that duty upon me. When I turned all of the mines back to their owners on October 12 I thought that I had done with that onerous and far from pleasant task. I did not ask that the mines be returned to me the second time. I did not even know that they would be. Nevertheless, I got the job again without even a chance to beg off. Frankly, I don't particularly like the job and I would prefer nothing better than to be done with it for good and all."

To these remarks he added the following. I wish to read them to you so that there cannot be any misunderstanding within the industry as to his situations with respect to your business. I quote:

"You here in this room know how many and what crazy rumors are whispered here in Washington, and listened to with bated breath. It has come to me from several sources recently that I am in favor of nationalizing the coal business. During my years as a public official I have heard and read many truly astonishing things about myself, but this is one of the silliest of the lot. How such rumors start I do not know, although it is easy to understand how they spread. Sometimes back of them is enough truth to germinate a thought, even if it is a crazy one. Sometimes rumors are merely malicious as to the person against whom they are invented. Sometimes they grow and ripen in the mind of a man who is disloyal to his country—a saboteur who wants to cause suspicion leading to friction, leading in its turn to a failure to produce at the maximum. But whatever may be the source of such pure invention, and whatever the object of circulating it, I want to say that I am not now, and never have been, in favor of the nationalization of the coal industry. I believe in individual initiative and in private enterprise, whenever private enterprise is able and willing to operate to the advantage of itself and without injury to the economy or the political and social institutions that the people have set up for their own good. The coal industry falls well within this definition and I cannot believe that the industry, as such, will do anything that might cause people to believe that it should be an exception to the general American rule."

I can assure you unqualifiedly that every member of the Coal Mines Administration's staff shares the Secretary's desire to return the mines as soon as possible.

The Secretary has adopted a policy of conferring with representatives of the producers and of the mine workers in connection with acting upon important matters pertaining to the administration of Government control over the coal mines. To facilitate this, he has named two committees of mine owners, one representing the bituminous producers and one representing anthracite, which are to advise and consult with him and with me. We shall call upon them freely for such advice and consultation as may be appropriate. Also, we shall advise and consult with the representatives of the producers as appropriate occasions arise.

Even after the mines have been returned and normal operating conditions have been restored under a wage contract, as it eventually must come to pass, the job of getting out the nation's coal will be far from easy.

Coal Industry Faces Huge Production and Distribution Job

During the six months from October 1, 1943, to April 1, 1944, our consumption requirements have been estimated at 335,000,000 tons of bituminous coal. For the full calendar year of 1944 we shall require more than 620,000,000 tons of bituminous coal to meet growing war needs. The probable anthracite requirements have not as yet been computed, but we may expect them, too, to be increased to approximately 66,000,000 tons.

To meet these requirements will require the utmost effort and cooperation by every man in the coal producing industry, both mine worker and mine management.

To maintain equitable distribution of this coal so that the essential needs of every consumer can be met will be an equally difficult task, calling for the utmost cooperation of the industry and of the consuming public.

We cannot hope to avoid closer controls over coal distribution, as the repercussions of the war increase requirements, handicap production, and disturb the delicate machinery of nor-

mal distribution. But it is imperative that we all work incessantly to maintain conditions under which the degree of this control can be held at a minimum. At all costs, we must avoid the necessity for strict rationing of the type that has been instituted to effect equitable distribution of fuel oil for domestic heating purposes. I think we all are aware of the difficulties that more rigid distribution controls would place in the way of attaining full production.

As Deputy Solid Fuels Administrator and Deputy Coal Mines Administrator, I can promise you that we shall help the industry in every way we can in meeting its problems with respect to price ceilings, manpower, and equipment. The decisions with respect to these matters, as you all are well aware, do not rest with the Secretary of the Interior.

You will be interested to know that the Secretary of the Interior has made representations to the proper authorities as to the vital necessity of protecting the coal mines from any further loss of manpower. A full-time officer of the Solid Fuels Administration has been given the task of helping the industry in matters pertaining to the protection and recruitment of mine manpower.

WMC Sets Up Recruiting Program

The War Manpower Commission is about to launch a nation-wide recruiting campaign for mine workers and is prepared to enlist the cooperation of all of its local officers in the effort to hasten the return of former workers to the mines and to enlist additional workers where they can be assimilated into the industry.

It is estimated by the Commission, on the basis of reports received from mine operators, that the current manpower needs of the nation's mines are 56,000 additional workers.

In this campaign, as in other Government campaigns, management and labor must participate if it is to succeed. It is contemplated that the support of operators' associations will be enlisted with the Government and the union to carry part of the burden of the campaign, and I am sure that with this participation the program will succeed.

The recruiting effort will be directed to two groups, those with mining experience and those who are physically qualified but without experience. For the latter group general recruitment will be carried on by the USES in all regions and areas. We hope to secure from this group some workers who can be assimilated into the mining industry successfully and who, after proper training, may become skilled miners.

Some segments of the management might be inclined to balk at this recruitment of inexperienced men, but the experience of other industries shows that it can be done in mining, although this type of worker may never attain the efficiency of the man who has worked in the mines since boyhood. The need is so great that we cannot afford to overlook any opportunity to recruit what manpower is available at this time.

The main objective of the recruiting campaign will be directed to those men who have worked in the mines and who for various reasons have gone to other industries.

The United States Employment Service plans, through interviews with former miners, to induce them to return to the mines.

If the personal interview plan is successful it will be extended to all areas where it is known that coal miners have migrated. Under present circumstances we believe a considerable number of first-class experienced workers will be recruited.

The War Manpower Commission's plan is comprehensive and carefully planned. You will be asked by your local War Manpower Commission representatives for assistance and cooperation. I am confident that you will join with the Solid Fuels Administration in working with these local offices and with the regional offices so that the objective of the campaign will be attained.

Industry Must Place Equipment Orders Early

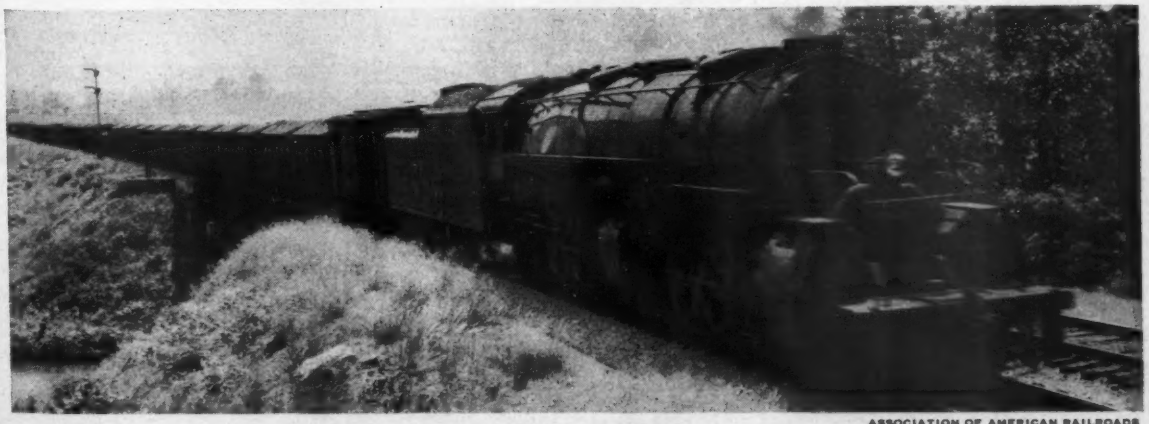
Another of the difficult problems that confront the coal mining industry is that of obtaining adequate equipment and materials to meet our expanding coal requirements. You will be glad to hear that the Solid Fuels Administration, the Mining Equipment Division of the War Production Board, and other interested agencies have obtained from the Program Committee of the War Production Board higher preference ratings and additional critical components for the coal mining machinery and equipment to operate at full capacity during 1944.

The Office of Lend-Lease Administration has already submitted requisitions, specifications, and rating applications for practically all of the equipment intended for export, and ratings have been issued by the Mining Division to cover these orders.

I have been informed by the Mining Division that it is now essential that it receive orders for equipment for domestic mines under this program at the earliest possible date, so that provision can be made for scheduling delivery of the machines and procuring the necessary materials and components.

Director Knoizen, of the Mining Division, has informed the Solid Fuels Administration that all orders for this critical equipment should be in the Division's hands by the first of the year, and by the end of January at the latest. He has informed us that adequate provision can be made for the necessary materials and critical components only when the actual orders have been received.

I cannot urge too strongly upon the industry the necessity for complying with Mr. Knoizen's request for expeditious submission of orders for equipment under the new program.



ASSOCIATION OF AMERICAN RAILROADS

Speeding coal to the war industries

Roof Falls in Metal Mines--Part II

Sounding of rock for the purpose of detecting looseness is a generally accepted rule of thumb, but not all miners have an acute sense of hearing nor do all loose rocks sound drummy.

By JOHN L. BOARDMAN

Chairman, Bureau of Safety
Anaconda Copper Mining Company

SO FAR we have discussed principally the mining conditions and the attitudes and responsibilities of the employer and his supervisors. Now we will discuss in some detail the responsibilities, skill and attitude of the miner.

The first item for our consideration is how may the miner detect loose ground? Apparently one of the first things that men discovered when they began to dig below the earth's surface was that a loose rock produced a drummy sound when struck by a tool or club, and a solid rock made a clear or ringing sound. Very few miners realize that a large piece of rock lying on the floor will give off the same ringing sound as will solid rock in place, although the rock on the floor is loose all around. This fact indicates that the sounds given off by a rock when it is struck are not necessarily produced by vibration of the rock but are the sound waves produced by the blow. When these sound waves travel through solid rock so that they are not interrupted, they proceed until the energy of the blow is dissipated, and are not reflected back. Thus, the ringing sound is heard. However, if these sound waves encounter a crack or air space they are interrupted and reflected back to produce the drummy sound which we have so long used as an indication of looseness.

Proper Testing Depends on Sound, Sight and Vibration

The sounding of rock for the purpose of detecting its looseness is still the principal, and in many cases, the only means the miner has for detecting its state of repose. However, if we are to make any progress in preventing accidents from loose rocks, we must consider the fact that, in many men, the sense of hearing is the least acute and least dependable of our senses. Also, many loose rocks will not sound drummy. We must teach the miner to use and depend also upon his sense of sight. By proper lighting and intelligent observance of the back and sides of his working place, by noting the presence of slips and checks, and the direction of powder cracks, he can readily determine which rocks to suspect of possible looseness. The sense of touch should also be used when possible. Very frequently the miner can place a hand or fingers on a rock which he is sounding, then, when the rock is loose, he may feel the vibration produced by the blow.

Injuries due to falling rocks are of such importance that we must use all our senses to the fullest possible extent in detecting them. Detection alone, however, is not sufficient. Having found loose rocks, we must then proceed to take them down, block them up, or stay from under them. We must get over the idea that a loose rock which cannot be taken down is safe to work under. In our district, and I presume in many other districts also, the accident report contains a statement of the uninjured work part-

IT SOUNDS LOOSE, BUT IT WILL STAY UP 'TIL WE GET THE TIMBER IN
IT OUGHT TO, BUT IT NEVER DOES! WE'LL STULL IT UP!
TAKE NO CHANCES!
STULL IT UP

ner. In a very large number of these statements we find: "I don't see how it fell. We both tried it with the pinch bars, and even with two pinch bars on it, we could not get it down."

The cure for this is a strict compliance with our Safety Rule No. 70: "In every case where rock appears to be loose but cannot be taken down, it must be stulled or stringered before anyone may work under it." When a rock which has not been supported by stulls or stringers falls on a man after they tried to get it down, they must not tell me it did not appear to be loose. The fact that they tried to bar it down is sufficient evidence that it appeared to be loose.

The job of barring down is one of the miner's most difficult tasks and, therefore, the one most likely to be neglected. Failure to bar down loose rocks is the source of many falling rocks injuries, but, on the other hand, we have many such injuries to miners while they are engaged in barring down. Some of these are due to the use of a too short pinch bar, so that a man must stand under the loose rock in order to reach it; others are caused by poor judgment in going out under loose ground to reach loose pieces which, when taken down, release others directly over where the miner is standing.

While remaining under timber or under back which he knows is safe, the miner should give the place a thorough visual inspection and select the safest corner to work in. He should then get his pinch bar and trim out this corner before advancing into it. Following this procedure of making certain that the back is safe before advancing, he can avoid injury. Whenever pieces are found that are loose but that cannot be taken down in this manner, safety stulls should be set before proceeding with the job of barring down.

IN RATTLESNAKE COUNTRY YOU LOOK AROUND BEFORE YOU SIT DOWN
OH, OH! WAITING FOR A VICTIM!
A RATTLESNAKE SLAB
DO LIKEWISE IN DANGEROUS COUNTRY, UNDER GROUND

Timbering Gives Support and Warns of Rock Movement

Our next item is consideration of mine timber. The primary purpose of timber is, of course, to support the loose rocks. In fact, with the single exception of one stope cave-in previously mentioned, we have had no trouble with any rocks which were too heavy to be supported by proper timber placed at the right time.

Timber has a very important secondary purpose, and that is to give evidence of rock movement. It does this by making noises and by visibly taking weight. No rock ever falls suddenly. We only get the impression of sudden movement because our senses are too dull to note what has been going on. When the loose rock begins to move, it may spend several minutes or even hours, or days, in crushing the small supporting particles, or in overcoming the various frictional resistances to its movement. But these movements are, in the beginning, invisible and inaudible to us.

If we could apply some sound magnifying device to each such loose rock we would hear it shouting its warning very definitely in plenty of time to escape injury. Timber is the only practical means we have of magnifying the noises of the beginning movements of loose rocks, and we can also, by close observance of the timber, estimate closely how much movement is taking place, and the approximate size of the moving ground.

I am reminded of the experience of one of our bosses. "Tony" was a good miner, and one day said to his boss: "These-a slab in da hangin' walla she's-a loose." The boss asked him how he knew, and he replied: "Before yesterday I'm-a putta de wedge in da cracks. Yesterday she's-a falla out. I'm-a put in tree more wedga and hitta dem with da axe. This-a morning today she's-a all fall out. These slab she's-a loosa." The boss told Tony to block the manway off by guardrails and keep away from the slab as they would be running in the filling next day. However, Tony was correct because the slab was down the following morning on top of a couple of sets of stope timber. This story is told to illustrate the ingenious ways that miners may find to detect moving ground.

Thus we know that the use of mine timber as a means of giving warning is an important item. We lose much of this particular value, however, when we set timber loosely. Proper blocking is as important as the timber itself. The use of adequate headboards on stulls serves the dual purpose of supporting a greater area and of producing a great deal more noise when the rock begins to move.

In the use of stringers in advance

of regular timber sets it is very important to lag them completely and block them to the back as well as to block against any loose pieces. A loose rock of only a few hundred pounds' weight falling a distance of two feet will break down stringers which might support a ton of steadily applied weight.

Responsibility of Supervisors and Miners

It has been the writer's experience that the mine supervisor is almost solely responsible for determining a safe working method, size and shape of openings, supply of tools and timber, and for the training of the miners. The miners themselves are responsible for proper inspection, trimming down, and for adequate support of any rocks that are loose but which cannot be taken down.

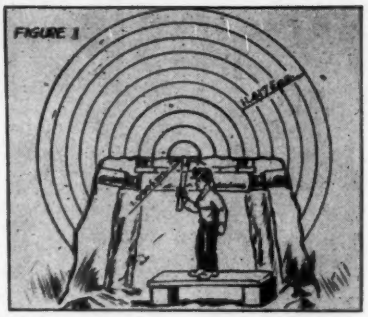
This still leaves us with the problem of accidental overbreak in which the usual blasting round breaks more ground than was intended or starts a movement of the ground which finally results in a much higher or wider excavation than was planned. Catching up such places is a dangerous job but one in which there is very seldom an accident. The fact that men can do this work without injury is another proof that any and every kind of ground can be successfully and safely mined if the supervisors and miners will adopt the right method and are careful enough.

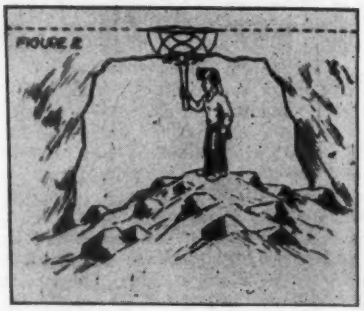
In the opinion of the writer there is no adequate substitute for the individual man to man contacts between shift bosses and miners for the prevention of falling rocks injuries. The boss can visit the miner in the working place and give him specific instruction regarding the handling of loose rocks. However, the safety engineer can greatly assist the shift boss by carrying on a propaganda campaign designed to keep the miners thinking about the subject.

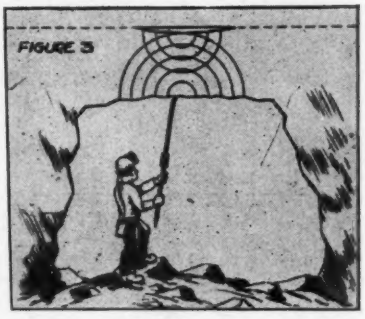
Safety Talks Keep Men Safety Conscious

We designed a 10-minute illustrated lecture for this purpose, and gave it to groups of miners at the beginning of the shift. In most Butte mines nearly 45 minutes is required to lower the shift into the mine. We went to each mine in turn at 8 each morning and took a group of 50 to 75 men who were waiting their turn to be lowered. These men were assembled in the carpenter shop, and the lecture was presented to them.

We borrowed the basic idea of this illustrated lecture for miners from the paper on "What do we actually know about roof testing?" by John E. Jones of the Old Ben Coal Corporation which was presented to this Congress in the 1940 session. The lecture is neither scientific nor accurate, but it does serve the purpose of increasing interest in the subject of loose rock among the men who must daily face such hazards.







Our first sketch (Fig. 1) is an attempted illustration of the travel of a sound wave through rock. We all have seen a pebble thrown into still water, and how a circular wave is set up. This wave travels on and on until, finally, it is dissipated because the friction of the water has used up the energy of the falling stone. A sound wave is quite similar except that the sound wave is not an actual visible movement but is a vibration, the extent of which depends upon the force of the blow with which the rock is struck.

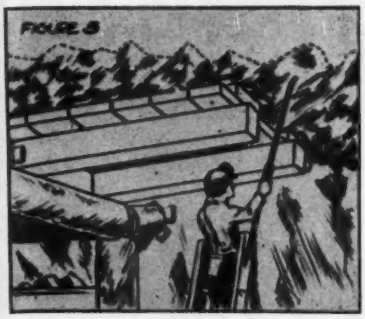
Thus, our purpose in sounding a rock is to make it vibrate so that we may tell by the nature of the vibration or sound whether the rock is loose or solid. Therefore, it does no good to sound for loose rocks with a light tool such as a shovel or stick. We must use a tool, such as a hammer, pick or pinch bar, and strike a real blow in order to produce a dependable amount of vibration.

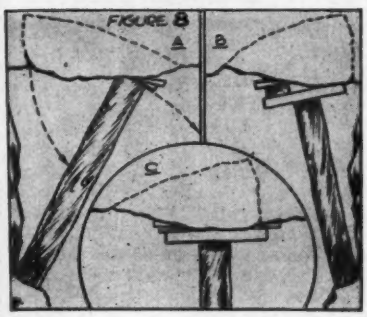
What do we mean by the nature of the vibration? If the water is still the wave continues outward from the center in a smooth circle, and it goes on by, and we see it only once. But if it strikes some object or is caught by the wind it breaks up and becomes choppy and we then see a whole lot of waves.

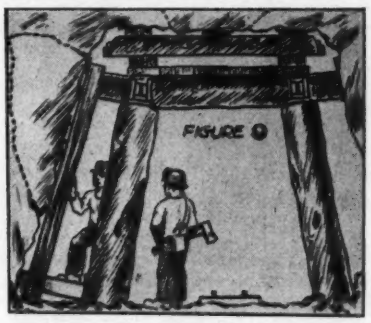
It is the same with the vibration or sound wave. If the rock is solid so that the vibration can travel through it without interruption we hear it only once, and we hear a clear, ringing sound. But if the vibration encounters a crack in the rock it is interrupted. Now, we refer to Fig. 2 in which we show a sound wave being interrupted by a crack or crevice.

When it strikes the crack it goes out of the rock into the air space of the crack or crevice and is slowed down. At the slower speed it goes on and strikes the rock at the other side of the crack, and is reflected back to us just as the sound wave produced by striking a drum-head is reflected back when it strikes the opposite drumhead. But each time the wave goes through the air space its speed changes and it gives a different sound. So, in the this case we have the "drummy sound" which miners all over the world have come to associate with loose rock.

In Fig. 3 we show a case in which a crack or crevice does not give us a "drummy" sound. This may be due to the fact that the crack is too far, or to the fact that the blow which caused the vibration was not strong enough to make it go so far through the rock and get back audibly to our ears. In Fig. 4 we have a similar case due to a different cause. In this case the vibration or sound wave strikes a crack or crevice which runs at a sharp angle to the direction of the blow struck When this wave is reflected back it will come back at right angles to the slip or crack and thus will not reach us. This will give the same effect as if the crack were too far away or the blow too weak. In such a case we would not get the clear, ringing sound of solid rock nor the drummy reflected sound of loose rock. But we would get a dull, thudding







sound which may also characterize loose rock.

Thus we learn the reasons why we cannot always depend solely upon the sound of rock to tell whether it is loose or not. In many cases we must guess, and thousands of miners each year guess wrong. Another reason why we must find something to supplement our sense of hearing is that the sense of hearing is the least sensitive and the least dependable of all our senses. In fact some men are completely tone deaf and could not distinguish between a clear, ringing sound and a drummy sound. Fig. 5 shows where a miner is not taking any chances upon the frail sense of hearing. He is remaining under timber while he inspects the back of the drift both by sounding and by carefully looking at the various cracks and slips.

Fig. 6 illustrates the use of another of our senses, that of touch or feel. This man places one hand on the suspected loose rock and then strikes the rock with the hammer. Thus, he may not only hear the sound but he may also feel the rock vibrate if it is sufficiently loose.

Fig. 7 is another illustration of the way to use the sense of sight for detection of loose rocks. These men remain under timber while they flash their lights over the back and sides to note the direction of the various cracks and slips. Thus, they can figure out which pieces might be supporting other pieces, and they plan out the method of attack before they go out under the freshly-broken ground.

In Fig. 8 at (a) we have an illustration of how a stull is sometimes set in such a way that it makes the loose rock more dangerous than it might have been without a stull. You will note that if that rock did happen to fall it would pinch the stull out and would ride the stull down, thus throwing the rock out farther toward where the miner is working. At (b) in this figure we show a stull properly set in a good hitch and with a good headboard which will not only lend support to the loose rock but also by snapping and cracking will give a good audible warning when the rock begins to move. At (c) we have a stull with a good headboard set vertically under a loose rock which is, of course, the very best way to set stulls when it is practicable to do so.

In Fig. 9 is shown a method of bridging over a cap and along the side of a post to lend support to loose ground, and a timber set in such a manner as to protect the timber and make it easier to ease off and change timber when this becomes necessary.

Fig. 10 shows a block placed in the center of a cap to show what might happen when this wrong method is used. In this case if the loose rock moves the first thing it would do is to break the cap and allow the set to collapse.

Thus it will be seen that the prevention of falling rocks injuries depends upon making full use of our senses of hearing, seeing and feeling, and then upon the exercise of good judgment in handling loose ground.

Butte Hill looking northward from the city

Iron Ore Production and Reserves Of Michigan

Three ranges, the Marquette, Gogebic and Menominee, account for the major output of ore from the state. Underground exploration and development must be facilitated to allow maximum efficiency from existing mining equipment. Potential ore bearing areas offer encouragement for the future.

By FRANKLIN G. PARDEE
Michigan Geological Survey

SHIPMENTS of iron ore from Minnesota in 1939 were 33,022,890 tons and in the same year Michigan shipped 11,239,895 tons. Similar figures for 1942 indicate Minnesota shipments at 75,240,496 tons and Michigan 16,163,-104. These figures show that the open pit mines of Minnesota were able to increase production to meet the war demands by a much greater percentage than the underground mines of Michigan. This is a general statement which does not consider fully the facts that part of Minnesota production is produced from underground operations and that the siliceous ore and a small amount of high grade ore from Michigan comes from open pit operations. It does demonstrate that the production rate of underground mining operations cannot be altered over as wide a range as can be done in the open pits. Underground production is restricted in many ways—hoisting capacity, underground openings, etc., and development and production schedules at each mine have been set with their particular limitations in view. In most cases these determining factors cannot be altered rapidly and therefore control maximum production schedules.

When the call came for larger quanties of ore, production rates in Michigan were increased to ultimate capacity, and development work was subordinated. This decision was not made from choice but from shortage of supplies, plant capacity, and especially the lack of sufficient trained miners. The result for 1942 was a maximum shipment from the mines of the state, and a large tonnage is scheduled to go out of Michigan again this year.

A comparison of the estimated taxable reserves of ore in Michigan for 1942 and 1943 (1942 reserves, 134,-509,732 tons; 1943, 139,457,376 tons) indicates at first glance that the record production for Michigan mines in 1942 did not interfere with development as the total estimated reserves of the state were greater on January 1, 1943, than they were on the same date in 1942. A study of the details of these estimates shows that the favorable results obtained at a few properties offset the drop in reserves at a majority of the mines. This increase, however, is an illustration of the fact that the ultimate production from Michigan cannot be measured by the known reserves at any one time.

An example of this statement is the following summary made up to show the estimated tonnages of ore on January 1 of the past four decades. These published estimated reserves are not to be confused with those estimates made largely from geological evidence to indicate ultimate production as these published figures are prepared for the Michigan Tax Commission to show the mineable ore expected to be found on the actual property assessed.

Michigan Taxable Reserves of Iron Ore

January 1, 1913..195,724,605 tons
January 1, 1923..196,828,948 tons
January 1, 1933..164,632,117 tons
January 1, 1943..139,457,376 tons

During the period from January 1, 1913, to January 1, 1943, the iron mines of Michigan have shipped 360,-216,779 tons out of the state. This latter figure includes about 5 percent siliceous and low grade ore which is not estimated or carried in the reserve figures shown in the table. On the above basis the depletion of the Michigan reserves has been a little under 30 percent from 1913 to 1943 or less than 1 percent per year.

Type of diamond drill rig used in exploration for iron ore

From a geological standpoint it is possible that many unexplored areas in the present mining districts carry commercial deposits of iron ore and there are undoubtedly other potential ore-bearing areas outside of the known producing districts. If it were entirely a question of reserves, iron mining could continue in Michigan until all these areas have been explored and the possibilities exhausted. However, reserves are only one of the items which determine the length of time a mine can keep in operation. Economic factors are of equal, or in some places of greater importance than the amount of reserves. Many places in the Lake Superior district are known to carry iron ore but cannot be opened for mining due to some physical or economic factor. For example, a partially worked out mine which had been flooded during times of small ore demand cannot be pumped out if the expense of removing the water is greater than the value of the remaining ore.

Exploration and Development Needed

Adequate exploration and development is the key to sustained large tonnage shipments of iron ore from Michigan. This means that sufficient labor, supplies, and funds to finance the work must be available. There has been some lag recently in exploration and development, in an effort to get out as much ore as possible. Formerly development programs were set up in relation to a normal demand for

ore, and this timing of operations was determined by physical conditions at each property. Under war demand the production tempo has been speeded up without a corresponding increase in developing schedules. Although results have not been very evident so far, it will not be long under present conditions before development work will have to take precedence over production, or additional men and funds furnished for exploration and development. In order to maintain production this latter plan should be followed, if possible, to insure adequate iron ore for the war effort and a healthy iron mining industry in Michigan.

In a discussion of the future of iron mining in Michigan, concentration of the lean ores assumes the same importance in this state as it does in Minnesota. Large areas of low grade material at this time are not commercial, but there is no question that under proper conditions and methods Michigan could supply a large tonnage of material for the furnaces from the low grade ore deposits of the state. Here again the question of economics enters the picture and the need for experimental work to develop these low grade ore deposits cannot be stressed too highly.

Iron ore is produced in three main districts in Michigan. Each has somewhat different characteristics, and therefore they should be examined separately.

Marquette Range

The Marquette range is the location of the first iron ore discovery and mining in the Lake Superior region. Ore has been produced from this district for nearly 100 years, and the end of the mining is still in the distant future. The early explorations and mines were shallow, but deep ore has been found that, with modern machinery and tools, will be produced for a long time to come. Not all of the potential ore bearing areas in this district have been examined thoroughly. Possibilities of concentration of some of the low grade material that can be mined cheaply by open pit methods represents another possible source of iron from the Marquette range. If the present demand for iron ore continues for some time, there is little double that the Marquette range can maintain its position without a great deal of difficulty, provided sufficient exploratory and development work is carried on. Continual large scale production would require the opening of several reserves that are now idle and would mean a great deal of exploration and development in this period, but careful examination of all the factors indicates that the Marquette range can meet the extraordinary demand of the wartime economy and still have adequate reserves for many years production after that.

Showing timber squeeze in Gogebic Range iron mine

Gogebic Range

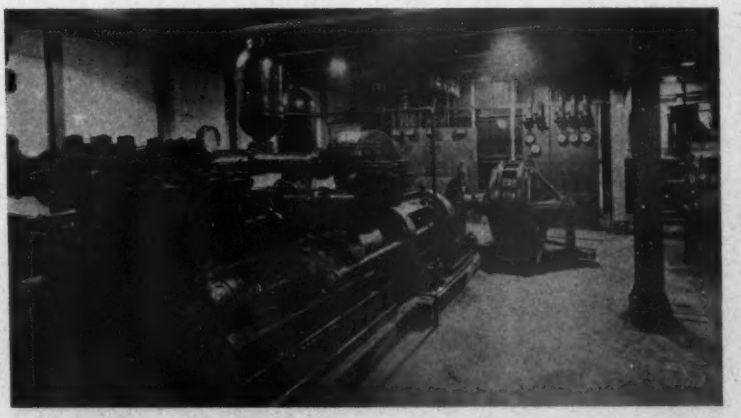
The Gogebic range is not in as fortunate a position as the Marquette, and the same studies of mines in this area indicates that production from the present properties and known reserves cannot be kept up for many years unless unexpected developments occur. The Gogebic range, as now known geologically, consists of a single iron bearing series dipping steeply to the north. No parallel productive formations have been discovered, and the limited surface extent of the iron bearing rocks curtails the possible areas for exploration. In fact, the future of the Gogebic range as now known lies in mining at depth.

The deepest iron mine in existence is located on this range with a bottom level 3,300 ft. below the collar. Failure of ore concentration due to depth is not at present indicated, and it is possible to look for ore bodies extending to much deeper levels than are now known. This does not mean that the ore at these great depths can be mined commercially, as the economic factors assume great importance in this class of mining.

Just how long the deep Gogebic mines can compete with the open pit properties and shallow mining in other districts cannot be determined now. The large capital investments needed to take out the ore and the heavy cost of exploration and development are factors in this problem. As it appears now the continuation of mining on the Gogebic range will depend more on the economic factors just mentioned than on the extension of the ore bodies.

Menominee Range

The Menominee range consists of two areas, the old Menominee in Dickinson County, and the Iron River-Crystal Falls district in Iron County. These areas have been classed together statistically for many years, but geologically and from a mining



Pump station in a deep underground iron mine

standpoint the Dickinson County and Iron County ores are not the same.

There were a number of large producers of high grade ore in Dickinson County, but at the present time only one property producing this type of ore is in operation. It does not seem logical to assume that these worked out deposits and the present operation represent the only ore in this area. A great deal of exploration has been done and more will have to be done. The future of Dickinson County depends on the results of exploration. Concentration of low grade ore from Dickinson County has not yet been thoroughly tested but should be given careful consideration.

The history of iron mining in Iron County includes the records of a large number of mines, many of which were abandoned or worked out at fairly shallow depths. There is a large area of unexplored territory in Iron County but exploration has been hindered by the deep surface material and lack of outcrops. However, the areas of potential ore bearing ground in the county are sufficiently large to warrant the prediction that iron mining will continue here for a long time to come. The grade of ore from Iron County has not been popular with the furnace men in the past on account of the phosphorous content. Whether this condition will continue in the future depends on the needs of the steel industry, but under a wartime or extraordinary demand for iron ore there is little question that Iron County will be able to supply large tonnages for a considerable period.

The Menominee range as a whole, both Dickinson and Iron Counties, has been studied in a manner similar to the other districts, and results show that here also the maintenance of production depends largely on exploratory and development work.

Geological field work in Dickinson County

Other Districts

The iron ore carrying formations have been found in several outlying districts in Michigan which have been of minor importance in the past but may provide additional tonnage in the future. The Gwinn, the Republic and the Calumet districts are examples of this statement, and it is very probable that with more exploration all of these minor areas will help keep up production from Michigan.

Summary

It is evident from the above that the future of iron mining in Michigan is as dependent on exploration and development as on reserves. For the war effort it will be necessary to emphasize development more strongly in order that the the available mining facilities can be used to the best advantage. Exploration for high grade ore must be continued. The search for suitable low grade ore and economical concentration methods is also essential. This program, if carried out, will do much to perpetuate the iron mining industry in Michigan.

An open pit iron ore mine in Minnesota

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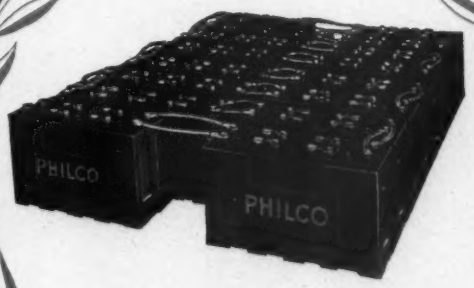

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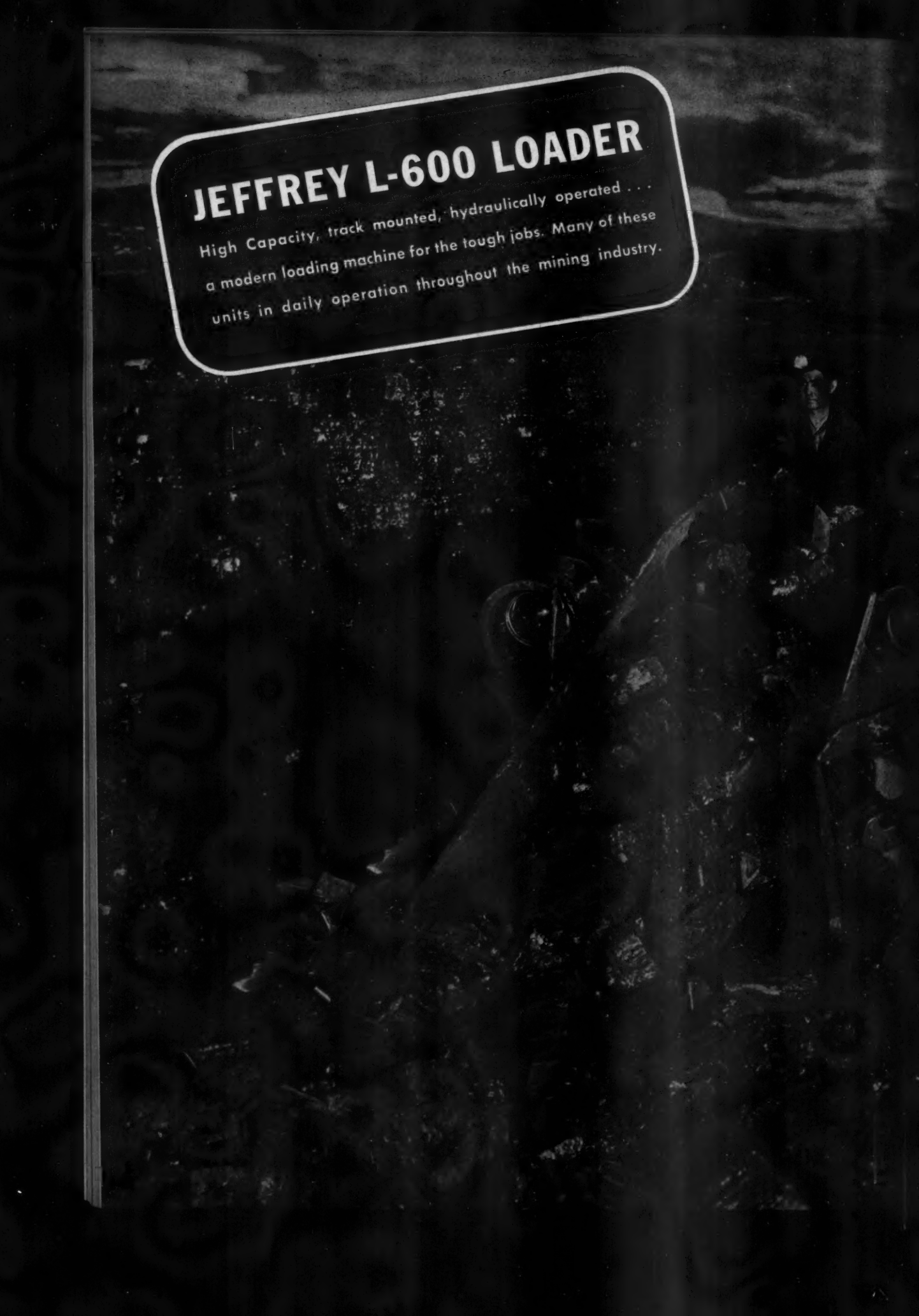
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The Hermes Quicksilver Mine

PART II—THE PRESENT OPERATION

Faith and persistence and a "nose for ore" largely responsible for the remarkable development of Hermes. Has become one of the three highest producers of quicksilver in the United States. Geology and operating methods described.

By WORTHEN BRADLEY

President, Bradley Mining Co.

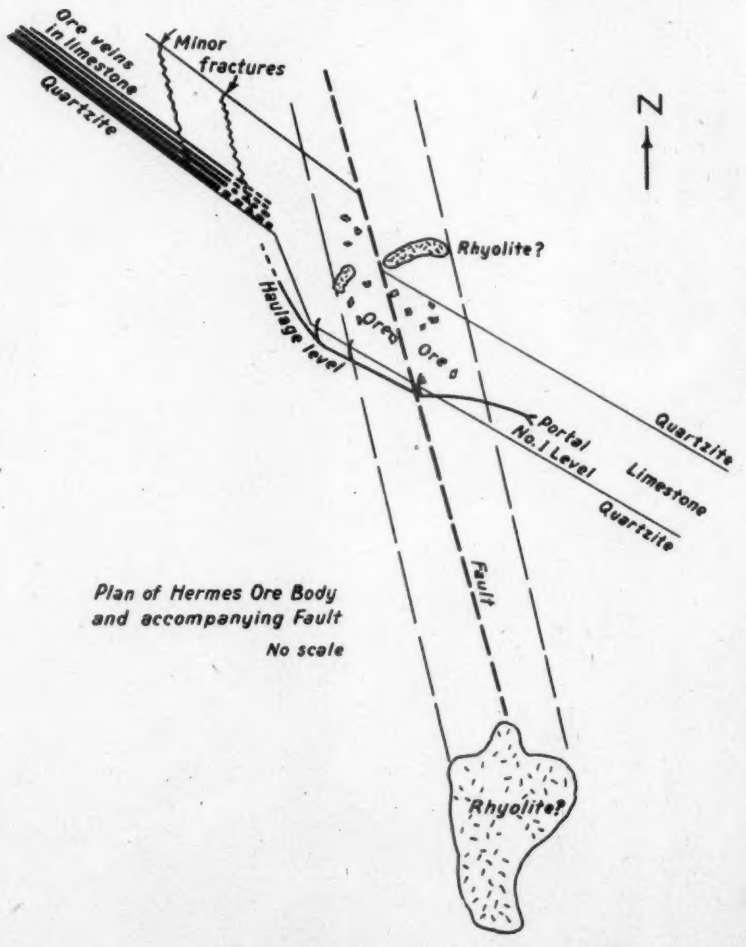
IN THE preceding article it was related how an Idaho mine with practically no previous production — 22 flasks prior to 1942—has become one of the three highest producers of quicksilver in the United States. This achievement has been brought about by the faith and persistence of John J. Oberbillig, president of United Mercury Mines Co., the owning company; to the "nose for ore" of H. C. Wilmot, the engineer who has had a high percentage of success in his development of new mining properties; and to the administrative skill of the officers and staff of Bonanza Mines, Inc., the operating company.

S. Reginald Smith is the Bonanza president, with office in San Francisco. Thomas A. Monahan is the resident superintendent at Hermes. The writer is indebted to these gentlemen for their courtesy and patience in answering questions, for several of the photographs used with these articles, and for the privilege of a tour of inspection of the Hermes operation. Acknowledgment is also gratefully made to the staff of the Yellow Pine Mine for transportation and other forms of assistance; and especially to J. A. Mecia, geologist of that mine, for his aid in working out the following paragraphs on Hermes geology:

Geology

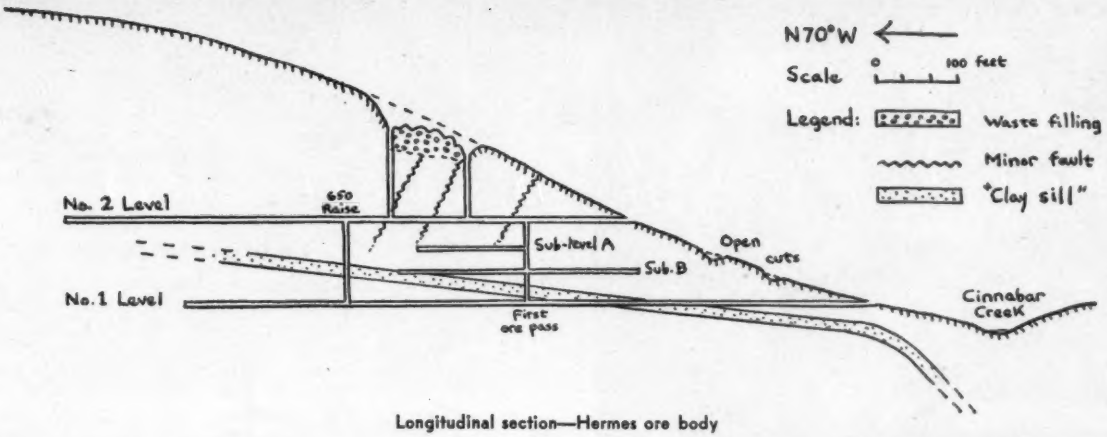
The ore mineral at Hermes is cinnabar, occurring as a replacement deposit in silicified dolomitic limestone. The limestone beds strike N. 70° W., stand almost vertical, and are 250 ft. wide between quartzite walls. Since there is an occasional slight dip to the northeast, the quartzite to the southwest is called the footwall. The ore is generally confined to several parallel veins in a width of 50 ft. on the footwall side of the limestone. Reading northeast from the quartzite footwall these veins are respectively (and approximately) 15, 7, 5, and 5 ft. in width. The first and widest vein is also the highest grade, offering a good chance for close selective mining, if that becomes a necessity. The waste intervals are of variable width, the greatest interval (up to 20 ft.) occurring between the first two veins. This "waste" will occasionally assay 1 or 2 lbs. of quicksilver per ton, and in a few places is of sufficient grade to justify mining across the full 50 ft.

A main fault, striking N. 15° W., seems to cut across the southeast end of the ore body, west of No. 1 Portal, shifting the sediments south in that area (see plan sketch). In the limestone the multitude of minor faults, most of which also strike N. 15° W., are probably tension fractures re-



Plan of Hermes Ore Body and accompanying Fault

No scale



Longitudinal section—Hermes ore body

lated to the main fault. A pre-mineral rhyolite dike seems to have been intruded along this main fault. Dike fragments are found included in the ore body, and the best ore is often associated with these fragments. However, much ore is also found northwest of the fragment zone, so the latter is apparently not the primary factor controlling the ore. The main fault and accompanying minor fractures seem more likely to deserve that honor.

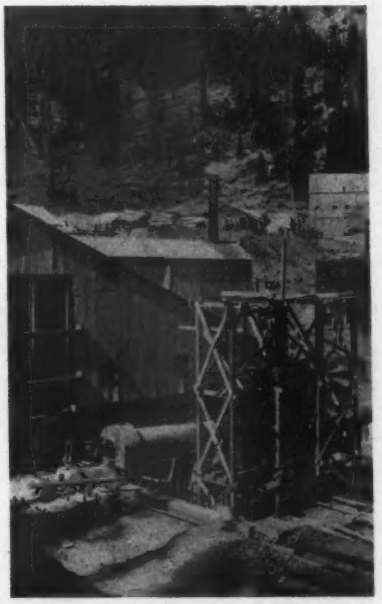
It must be admitted that the evidence for the above geologic conclusions is somewhat incomplete.

Mining Conditions

Of the 110 men on the Hermes payroll in July, 65 worked underground. They enter the mine through either No. 1 or No. 2 Level Portal, No. 1 Level being the main haulage way. The old adit ran a distance of 850 ft. northwest in heavy, swelling ground, and has since been redriven for much of this length. The parallel adit leaves the main haulage way 90 ft. in from the portal, branching off to the west and getting away from the wet limestone and into the hard quartzite. Between this and No. 2 Level, which is 100 ft. higher, there are two sublevels and a number of main raises, ore passes, and ventilation raises. No. 2 Level is connected with the surface by stope raises and waste passes.

Owing to the 18 degree slope of the hill No. 2 Portal is directly over a point 300 ft. in from No. 1 Portal. The first No. 2 to No. 1 Level ore pass is 430 ft. in from No. 1 Portal. At present the active development of the ore body extends to 650 ft. northwest of No. 1 Portal, the last main raise being at that point. No. 1 Level drives onward for another 200 ft., and No. 2 projects into the hill 700 ft. northwest of its portal. The face of No. 2 is still in ore; so that from No. 1 Portal to No. 2 face there is a horizontal ore length of 1,000 ft.

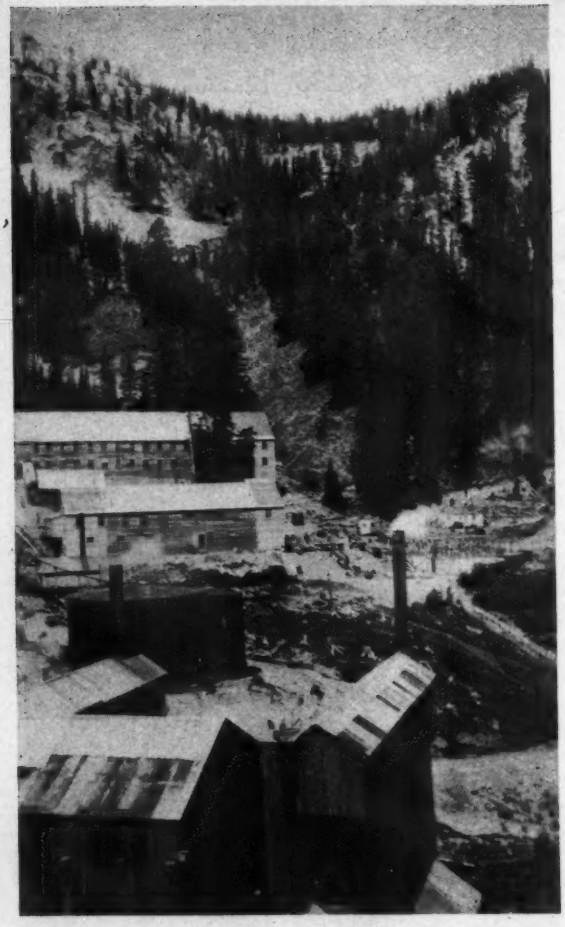
Actual exposed ore length is somewhat less than this 1,000 ft., as the ore body rakes to the southeast at a 7-degree angle. However, the total mineralized zone has long been believed to total at least 3,000 ft. Extensions of the known ore body, further northwest and southeast, have been picked up by U. S. Geological Survey and Bureau of Mines prospecting and drilling. In July part of the southeast extension was being exposed by dragline scraper a few hundred feet south of No. 1 Portal. If the ore proves commercial at this point it will be very handy, being immediately adjacent to the track to the plant bins. Bonanza Mines, Inc., is patenting additional claims to the southeast, on each side of the original Oberbillig strip, and around the Fern group.



Construction of Plant No. 2

Depth of the main ore body, northwest of No. 1 Portal, is about 250 ft. where it can be fully measured. It is topped by 40 ft. of overburden at its uphill end, and is cut off at the bottom by what is known locally as a "clay sill" (see longitudinal sketch). This sill is actually a flat fault, with accompanying 20 ft. thickness of gouge, raking southeast at a 7-degree angle. At No. 1 Portal this cutoff is somewhere below the level; at 650 ft. in it is 50 ft. above. The gouge is a brown, limey clay, with a 30-degree dip to the northeast. Low grade ore permeates its top 7 or 8 ft. in places, but none below that level. The early exploratory work at Hermes, mentioned in the preceding article, was done

General Superintendent Thomas A. Monahan in mine office



Plants 1 and 2 in foreground, cook house and bunk house in middle distance. Looking North. Note large fuel tanks

largely in and below this clay; the ore thus developed was disappointingly low grade, and the ground even wetter and heavier than the limestone above.

The clay sill was at one time thought to have been a controlling factor in ore deposition, but now the main fault (mentioned above) is more generally given that credit. The sill is probably of later origin than the main fault and dike intrusion. Mention has also been made of the minor fractures accompanying the main fault. In general they parallel that fault but they also strike and dip in all directions. And, unfortunately for mining procedure, they are often accompanied by horses of waste.

Mining of the ore proceeds from front to rear, that is from the portals toward the northwest. Ideally, it should be the other way around, because of the wet ore (10 to 12 percent) and very heavy ground. But it was necessary to start taking the closest ore to put Plant No. 1 into operation and to keep it going. The front part of the ore body is thus largely stoped out, especially between No. 2 Level and the surface.

In July the ore was being extracted between Nos. 1 and 2 Levels by square setting and filling. Waste (quartzite talus from the surface) was passed down main raises spaced 100 ft. apart. Stopes were 67 ft. long and 1 to 10 sets wide, and 33 ft. pillars were left between stopes. In the narrow stopes cars or wheelbarrows were used, but slusher hoists dragged the ore and distributed the waste in the wider stopes. The square set-and-fill system was not entirely successful, however, as there were places where the ground could not be filled fast enough to save the stope. The management has switched over to top-slicing as the most practical mining method.

Water courses are often cut during mining, and getting rid of this water is a problem in itself. It must be corralled and diverted, and ditches and pipes must be kept free from muck. While climbing around underground one sees water seemingly pouring from everywhere.

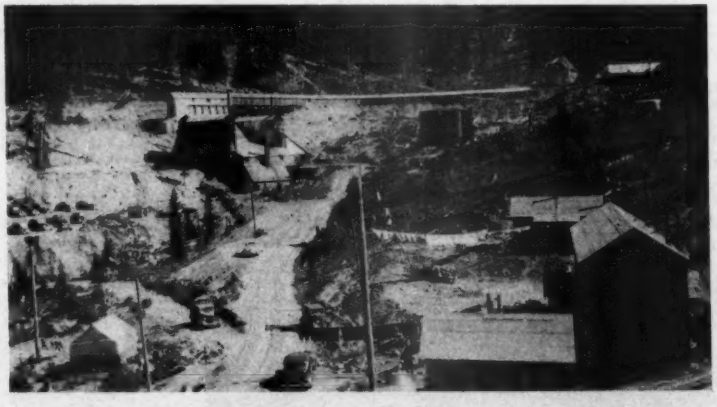
Underground Equipment

Mancha Trammers pull trains of four or five 40 cu. ft. side dump cars on No. 1 Level. The track gauge is 24 in. on that level, as well as on No. 2 Level. An 18 in. gauge track, and 12 cu. ft. end dump cars are used on the sublevels.

Consumption of powder and steel is light.

Du Pont 40 percent gelatin is used. Two tons of material (including development rock) are broken per pound of powder consumed. Ingersoll-Rand machines do the drilling: the jackhammers with ⅞ hex. steel and Timken bits, and the stopers with 1¼ oct. steel. Bits are hot milled in Boise. Augur steel is sometimes used. There are a few Eimco mucking machines. Carbide lights were used, but are being replaced by electric head lamps.

The two main adits require no timbering where driven in the quartzite footwall. But since the bulk of mining and development work takes place in the limestone, lavish quantities of timber are consumed. Engelman spruce is purchased from the Yellow Pine mine, which had a surplus in stock after converting from underground to pit mining. Timber is also cut by contract in the district, at a price of 8 cents per foot. In July the area being cut was a mile or so down Cinnabar Creek. Round timber of not less than 10-in. diameter (or 10 x 10 milled timber) is used in tunnel and square sets. It has been found that track and tunnel upkeep resulting from ground squeeze, is less when 3 x 12-in. foot



Looking west over camp. Plant and bins at left, snow shed in middle background, portal housing at right

Timber supply near No. 1 portal; line of outcrop at upper left; bunk house at right

blocks are used under the posts, and sills are omitted.

The timber framing shop is housed in at No. 1 Portal, as well as the blacksmith shop, mine office, lamp room, and a store room. The report has come in that on October 23 a fire broke out in the storeroom at the portal. Much of the portal housing and part of the connecting snowshed were burned. The maps in the mine office were destroyed, but there were copies of these elsewhere. The facilities of the neighboring mining town of Stibnite, were put to good use in this emergency. The Stibnite fire department responded to a telephone call and helped extinguish the blaze; and Stibnite's modern hospital received two Hermes miners who were overcome by the smoke which entered the mine.

The trains are pulled 560 ft. through the snowshed to the 500-ton coarse ore bin. From this bin the ore is pulled out of several flat chutes by an 18-in. conveyor belt. The ore passes over a 2½-in. mesh vibrator to a 12 by 24-in. jaw crusher, the screen undersize and the crushed rock being received by another 18-in. conveyor. From this conveyor the ore is distributed by a swinging gate to two 250-ton fine ore bins.

Ore Treatment

It is in the bins that the high altitude (close to 8,000 ft.) with its accompanying winter temperature (as low as —30° F.) makes itself felt. But if the ore can be kept moving it will not freeze.

From each of the fine ore bins the rock slides into a bumping feeder, by which it is propelled into a standard Gould rotary kiln, 4 ft. shell dia. by 64 ft. long. The two kilns were rated at 80 dry tons each of Hermes ore, and this has been reached at times; but the combined average has been 130 dry tons per day. At the present writing, in early November, the report is that as a consequence of manpower shortage only one kiln is operating steadily. The other is operating intermittently, and the combined tonnage is considerably below the 130 figure.

From here on the description will fit either Plant No. 1 or Plant No. 2.

The first 24 ft. of the kiln is lined with fire brick, the balance with pinite blocks. The high pressure burner is fired with 18 grav. oil, preheated to 125° F., and the fuel consumption is 8 gal. per ton of ore. The oil is delivered to large storage tanks by truck (all the way from Cody, Wyo.), at a cost of 11.5 cents per gal.

From the kiln, the burned rock drops into a 100-ton concrete "sweating chamber." During the day shift the calcine is drawn down through an arc gate to a 2-yd. dump truck, which distributes the material on the dump.

The gases from the kiln feed header are pulled through an 11-in. square flue and a cyclone type dust collector by a fan traveling at 1,800 r.p.m. The draft is 1 in. between collector and fan; the temperature is 450° F. out of the collector. The gas stream splits and passes on through two rows of cast iron condenser pipes, 14 in. I.D. by 20 ft. high, 12 pipes to a row. The pipes are connected down the length of each row, alternately at top and bottom, by cast iron U's. The top U's have openings which are kept plugged except when the pipes are hosed down (at least once a day). Each bottom U has an opening sealed by immersion in water held in a hard rubber bucket. The "soot" containing free quicksilver drops into these buckets.

From the condenser pipes the gases pass through two tanks in series. Each tank is 14 ft. dia. by 18 ft. high, built of redwood staves. Finally the waste gas is expelled through an 18-in. I.D. redwood stave stack. Temperature of the gas at the foot of the stack does not rise above 95° F., which compares well with a maximum summer atmospheric temperature of 85° F. Stack temperature was reduced from 120° F. by the use of water jets from pipes circling the outside of the stack.

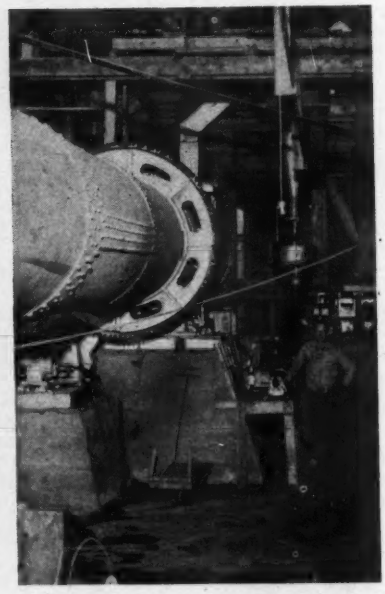
To return to plant products, 300 lb. of dust is collected daily from the bottom of the feed header. This material contains grains of unburned cinnabar, as well as free quicksilver; it is returned to the fine ore bin in buckets. A half ton of waste dust is sluiced away daily from the cyclone. It pans a trace of free quicksilver.

The soot buckets, under the condensers, collect a high grade product which is emptied on a hoeing table and the free metal worked out. The residue of this high grade soot, plus the low grade mud "from all over the plant" (from tanks and launders, for

Plant in foreground. Looking east over calcine dump. Note parked cars on dump and heavy growth of timber in background

instance) amounts to 1,000 lb. per day. This is placed in flat pans, each holding 100 lb. of material. The pans are fitted with rollers and run on a track. This track runs through the calcine "sweating chamber" and six pans are

Plant No. 1—sluicing away dust below dust collector



Interior of plant, looking toward head end of one of kilns. Note dust collector in right center background, with sluiceway (water being plentiful) under bottom cone

accommodated at one time inside the chamber. Every 1½ hr. two more pans of mud are pushed into the chamber, causing two pans of dried material to emerge from the other side. This is returned to the kiln via the fine ore bin.

This method of drying is an improvement over the old system of placing the pans on top of the sweating chamber. The plant building is completely enclosed, and closed up especially tight during the cold periods (7 or 8 months of winter, and every night of every month). The presence of open pans containing free quicksilver, simmering on top of a hot chamber, was a not inconsiderable health hazard.

The Hermes machine shop is housed in the plant building, and the power plant adjoins this shop. The power is furnished by one 360 hp. Ingersoll-Rand Type S diesel running continuously, and one 150 hp. Murphy diesel as a standby engine. Diesel fuel costs 12.5 cents per gal. delivered. But, as related in Part I of this article, the new Idaho Power Co. line is expected to be furnishing electricity by the end of this year.

The camp is large and well built, as befits the operation. The bunk house has been enlarged so as to accommodate 70 single men, and a recreation room has been added on the south end. There are 26 family cabins. New construction in July included a guest house and an office; the office at that time was temporarily housed with the commissary department, in the ground floor of the cook house.

In conclusion, it can be said that the Hermes mine possesses one of the largest reserves of quicksilver ore in the United States; that it is making a real contribution to the war effort; and that under the capable management of Bonanza Mines, Inc., it should have a long and successful operating life.

Riorden Lake, in the vicinity of Yellow Pine

Transporting Lubricants in and About Coal Mines*

Coal-mine operators show definite interest in lubricants from the standpoint of safety, elimination of waste and preventive maintenance. Recommended practices outlined.

By D. S. KINGERY
Associate Mining Engineer
Safety Division, Bureau of Mines
Pittsburgh, Pa.

RECENT Federal coal-mine inspections have revealed some good and some definitely hazardous practices and systems for transporting, handling, and storing lubricants in and about coal mines.

Improper storage or handling of lubricants in coal mines has caused disastrous mine fires or, by supporting combustion, has made fires from other sources more difficult to fight. Careless handling of grease and oil around electrical equipment wastes much oil and permits entrance of grit and foreign substances into the working parts, which causes excessive wear and increases the possibility of electrical ignition.

Mechanical-loading and multiple-shift operations complicate this problem. The operation of mechanical equipment for two or three shifts daily requires an available supply of two to four different types of lubricants. These must be transported and stored safely as otherwise they present a constant threat to the safety of the mine and to continued operation of the equipment.

The importance of storing and handling lubricants to prevent their contamination cannot be overemphasized. This means that open containers must be banned and great care must be taken in transferring greases by hand.

Convenient facilities for handling lubricants are necessary to enable employes to store, dispense, transport and apply them with proper care. Facilities for lifting heavy containers should be provided in the oil house on the surface or in the oil room underground. Concrete floors that can be

* Abstracted from Bureau of Mines Information Circular 7244.

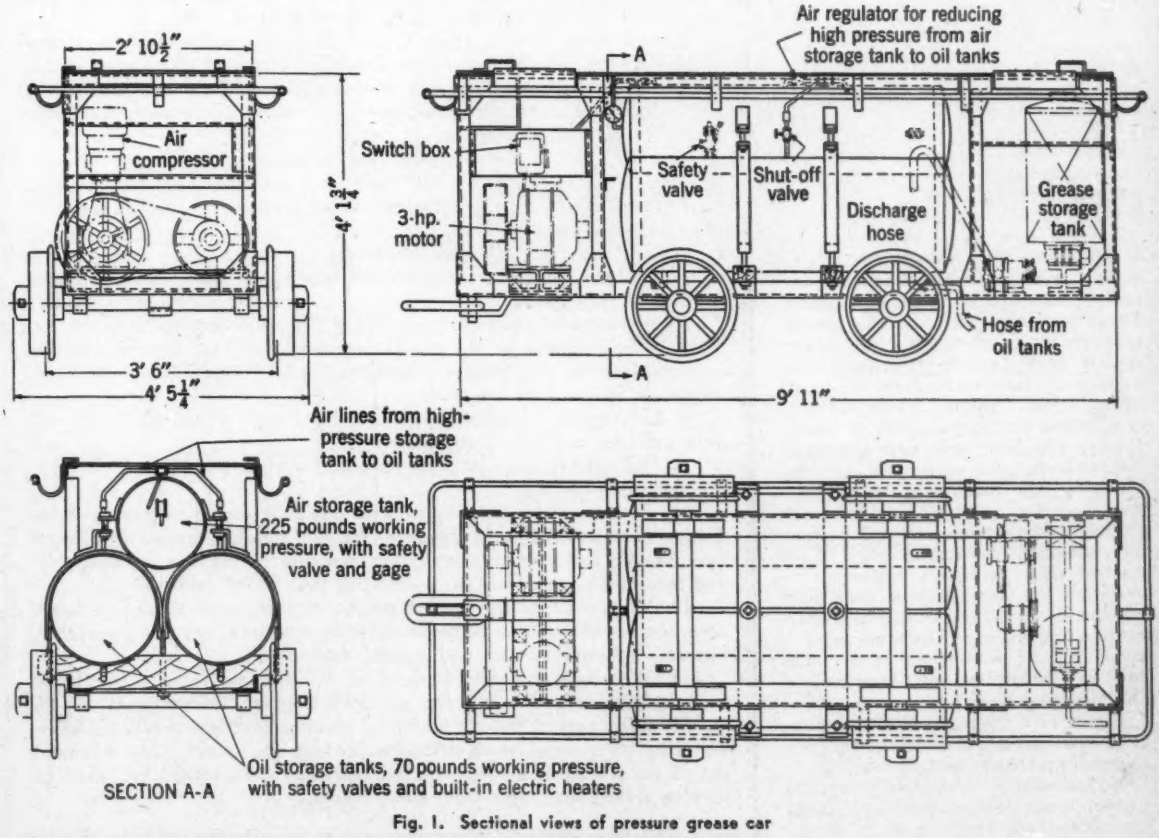

2′ 10½″
Air compressor
4′ 1¾″
3′ 6″
4′ 5¼″
Switch box
3-hp. motor
A
Air regulator for reducing high pressure from air storage tank to oil tanks
Safety valve
Shut-off valve
Discharge hose
Grease storage tank
Hose from oil tanks
9′ 11″
Air lines from high-pressure storage tank to oil tanks
Air storage tank, 225 pounds working pressure, with safety valve and gage
Oil storage tanks, 70 pounds working pressure, with safety valves and built-in electric heaters
SECTION A-A

Fig. 1. Sectional views of pressure grease car

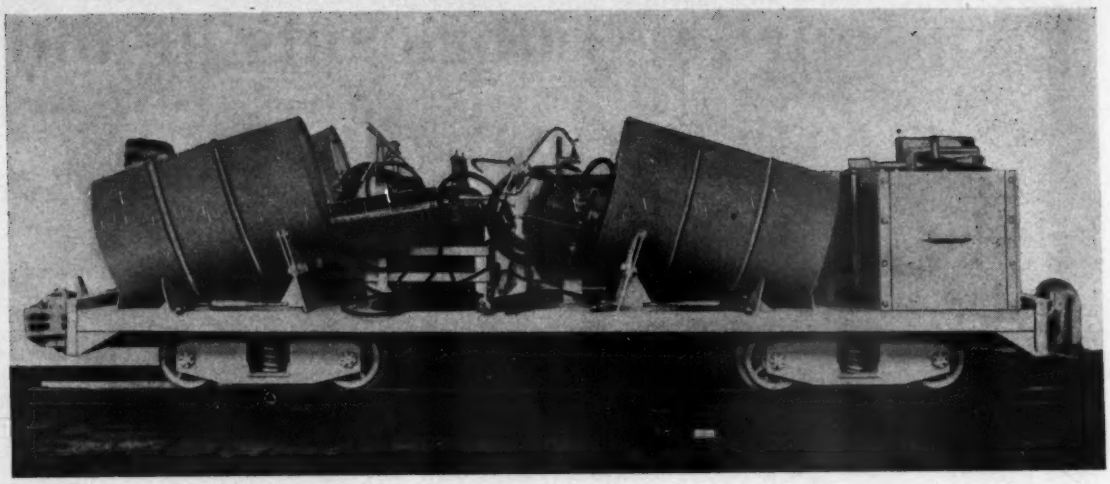


Fig. 2. Pressure grease car

cleaned thoroughly and barrel pumps, drip pans, and safe and efficient lights are required.

Responsibility for handling and using lubricants should not be divided. Individual containers should be provided for each man whenever possible.

Many coal-mine operators are showing a definite interest in lubricants from the standpoint of safety, elimination of waste, and preventive maintenance. Some operators have developed commendable systems and practices for this important phase of mining, and undoubtedly many others are interested in the subject.

This circular describes some of the better systems now in use and outlines recommended practices for transporting, storing, and handling lubricants in and about coal mines.

Use of portable-type lubrication cars is the safest and most efficient method of transporting, distributing, and using grease and oil inside coal mines. These cars are either of the special pressure-pump lubricating type or are special cars used to transport containers of lubricants from place to place. The special pressure-pump type serves the dual purpose of transporting the lubricants and providing the medium and equipment for lubricating the machinery with minimum handling, and eliminates inside storage and exposure of the lubricant to possible contamination. This method also provides a preferred lubrication job which can be done during the idle shift and be included with routine inspection of the equipment.

Several different types of portable cars now in service are illustrated in the following figures:

Fig. 1 is a diagram of a pressure-type lubricant car specifically designed to service mechanical equipment. With this type of car, mechanics or special greasers can lubricate all equipment during the non-working shifts or be-

Recommended Practices for Transporting, Storing and Handling Lubricants

1. Lubricants stored inside coal mines should be limited to small quantities and be kept in small spill-proof containers.

2. Fireproof buildings should be provided for the storage of lubricants.

3. Storage buildings for lubricants should be kept clean and free from oil or grease spillage, waste material, and material other than lubricants.

4. Approximately one day's supply of oil or grease is the maximum that should be taken or kept inside the mine at any time.

5. Fire-protection equipment, such as foam, carbon dioxide, or dry compound-type fire extinguishers should be installed at or near all oil-storage houses. A handy supply of rock dust would aid in at least some instances. Fire-protection equipment also should accompany lubricants being transported into the mine.

6. Lubricants should be taken into mechanical sections in covered, spill-proof, metal containers that hold approximately one day's supply.

7. In rapidly moving, mechanical-mining sections, oil-storage facilities should be provided by means of:

   a. Permanent fireproof buildings;

   b. Easily moved and assembled knockdown-type fireproof buildings of steel; and

   c. Portable, covered mine cars of fireproof construction.

8. All oil storage buildings and cars should be kept locked, and the responsibility for the proper distribution and disposition of lubricants should be assigned to one man.

9. Lubricating material should not be stored within 50 ft. of any door used for controlling ventilation.

10. All outside storage houses should be at least 300 ft. from mine openings or buildings.

11. Only enough lubricating oil for one shift should be provided for cutting machines. This oil should be kept in suitable grease or oil guns that can be fastened to the mining machine during the working shift and returned to the oil-storage house at the end of each shift.

12. Whenever possible, machinery and equipment should be lubricated on the idle shift or between shifts, by special crews using portable, fireproof lubricating cars and special equipment.

13. Whenever greasing is done at the working face, a supply of rock dust should be at hand and sprinkled over any spilled grease or oil.

14. Mine cars at the pit month or on mine bottoms should be lubricated by mechanical or electrical lubricating equipment. The lubricant should be stored in a fireproof building, and care should be taken to remove spilled lubricants from along tracks.

Fig. 3. Three compartment, double tank pressure grease car

100-gallon and 50-gallon compartments, enabling the car to carry three types of grease. The tanks are built of rolled steel, electrically welded.

This car is equipped with flowmeters to register the amount of oil or grease passing into the mining equipment. Attached to each meter is a 1-in. flexible hose about 40 ft. long which enables the greaser to reach any part of the equipment to be lubricated. At the rear end of the tanks is a regular traction brake motor and air compressor equipped with an automatic electric control switch, safety pressure release valve and pressure indicating gage. A constant pressure of 120 lbs. per square inch is maintained in each tank to provide pressure for greasing. This type of grease car proved so satisfactory at one mine that an additional unit was built.

Fig. 4 shows equipment of the pressure-type grease car described in Fig.

(*Continued on page* 56)

tween shifts and thus eliminate the need for storing oil or grease in the mine, only a small lubricant gun being required for servicing the equipment during the working shifts.

Fig. 2 shows a different, improved, pressure-type lubricant car, utilizing portable grease drums and electric lubricating guns. This car is used as described above; the lubricating is done during non-working shifts by special greasers or mechanics and virtually eliminates the need for lubricant storage facilities near the mechanical equipment.

Fig. 3 illustrates a pressure-type lubricant car similar to that shown in Fig. 1 Some of the specifications for this car are: Over all length, 9 ft.; height, 48 in. above the rail; and width, 52 in. The car is equipped with two horizontal lubricant tanks 26 in. in diameter and 65 in. in length. Each tank has a capacity of 150 gallons. One tank is divided by a bulkhead into

Fig. 4. Lubricating a loading machine with pressure type grease car

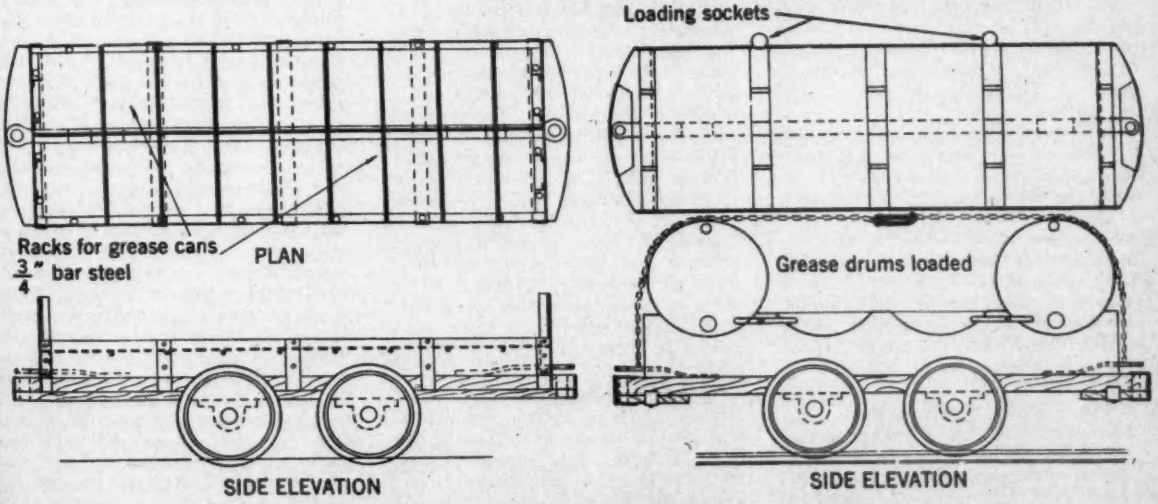


Fig. 5. Grease cars for transporting lubricants into the mine

Committees meet in general session

Annual Conference

of the Coal Division, American Mining Congress

All Committees Meet In General Session To Review Progress of Past Year and To Discuss Plans For Future Activities

A RECORD attendance of well over 200 men—executives, operating officials, engineers and manufacturers' representatives—met at the Ninth Annual Conference of the Coal Division of the American Mining Congress on December 3, 1943, at the William Penn Hotel, Pittsburgh, Pa. Intense interest was manifest by all present as the committees reviewed their reports which had been completed during the year and outlined new studies in preparation—giving major attention to wartime operation but directing some thought toward postwar developments.

In opening the conference Julian D. Conover, secretary of the American Mining Congress, took occasion to express the thanks of the coal industry to the committee members for their constructive contribution to the improvement of coal mining, and also spoke of the sincere effort which operators had made toward overcoming the interruptions to production which resulted from work stoppages during the wage negotiations. He said in part:

"This is the Ninth Annual Conference of the Coal Division of the American Mining Congress. Judging by the advance registration and attendance at eight committee meetings yesterday afternoon, we feel safe in saying it is the largest conference we have ever held and I want to express our appreciation to you men, with all the responsibilities and extra loads you are carrying, for taking the time to come here to do this work which means so much to the coal industry.

"Our meetings here are made up of men who individually are doing an absolutely indispensable job in keeping our mines running, and who collectively are working out the answers to some of the problems that confront the whole industry—the problems of getting better results at lower cost, and maintaining production in spite of all the obstacles of wartime conditions and government operation of our mines. These meetings have become a real institution because the men attending them have gotten definite benefits, in the form of information and ideas, that have enabled them and their companies to do a better job of mining coal.

"At the present time our Coal Division has 10 active committees, with a total personnel of nearly 200 men, including both operators and manufacturers — all working together for the improvement of coal mining. These committees have tackled a great many problems and have submitted some very valuable reports, which we are glad to present to the industry in the MINING CONGRESS JOURNAL. In many cases, reprints of these reports are sent to the Coal Division members, and judging from the requests that we receive for additional copies we can assure you that your work is very definitely appreciated by the industry, and is helping operating men everywhere to do a better job.

"At this point I had hoped to make a real speech concerning the accomplishments of the coal industry this past year; but unfortunately, we are not going to meet in full the production goal that was set, for reasons of which we are painfully aware. However, our rate of production, when we have been permitted to operate full scale, has far and above exceeded any level previously attained, and has demonstrated the industry's ability, if given a reasonable opportunity, to meet practically any conceivable demand that might be placed upon it. This is an extremely creditable performance. It is a performance that would have been totally impossible had it not been for the improvements over the last 20 years in methods of mining and handling of coal at every stage of the operations—improvements which have resulted from the application of brains and hard work on the part of the production men

and engineers on the one hand, and the manufacturers of modern mining machinery on the other. Together these two form a team that have put the coal industry in position to supply whatever demands for heat and power may be made by our war industries and by our domestic economy in these trying days. Their continued cooperation, as exemplified in our Coal Division committees and in our Conference today, is absolutely vital if we are going to win the war at the earliest possible date, and if this great industry is to function efficiently as a major force in the welfare of our nation in the years to come."

It was a source of regret to everyone that Harry M. Moses, chairman of the Coal Division, could not be present as he was detained in Washington by the wage negotiations. His sincere interest in the committee work has been an inspiration to the members, and his active leadership has contributed greatly to the progress which the Division has made.

At the morning and afternoon sessions, the committees were introduced by Glenn B. Southward, Mechanization Engineer, American Mining Congress, who explained that there was not time to present the reports in full but that each group would give a brief review of its activities. Eight committees through their chairmen and members gave resumes of their studies and recommendations on important phases of mine operation; an account of these session proceedings will be published in the January MINING CONGRESS JOURNAL and later issues will contain the complete reports.

Luncheon Activities

The luncheon meeting in the Silver Room proved to be a feature occasion, having as guest speaker Lieutenant John L. Russell of the U. S. Army Air Force—a Pittsburgh boy back in his home town after nine months' service overseas. Lt. Russell, a P-38 pilot, has participated in some 50 combat missions in the Mediterranean area. He is a squadron leader, one of the youngest in the service and holds the Distinguished Service Cross and the Flying Cross with nine Oakleaf Clusters. His squadron has received three Presidential citations, a most unusual honor, in recognition of the extraordinary gallantry shown in action. Lt. Russell has had 193 combat hours on bomber escort and participated in 16 missions for dive bombing or strafing.

Lt. Russell gave a stirring description of bomber and fighter operations in Sicily and Italy; his story, told in simple, direct words, always keeping his own actions in the background, gave everyone present a realistic picture of the bravery and fighting quality of our airmen. Of special interest was his reference to the teamwork of the flying squadrons and how the individual "dog fights" of 1918 have now been suspended by formations working as a unit. Following his talk, he answered many questions from the audience which brought out additional interesting details on the flying qualities and fire power of our war planes, and of the manner in which fighting operations are conducted.

Annual Dinner

A reception at 6:30 was followed by the Annual Dinner in the Urban Room, at which Mr. Thomas Moses, known as the dean of the coal industry, presided as toastmaster. Mr. Moses explained that he was serving in the absence of his son, Harry M. Moses, chairman of the Coal Division, and then said:

"This is the concluding event of the Ninth Annual Conference of the Coal Division of the American Mining Congress. This has been the largest attendance in the history of the Congress. The reports presented show that you young men in the coal industry are doing a real job to see that coal is mined to win the war, and to put the industry in position to meet the difficult problems that we will have in the years to come."

George E. Stringfellow, chairman of the Manufacturers Division, speaking for the manufacturers of mining equipment, stressed the need for complete cooperation during the war emergency between the industry and governmental agencies to assure proper distribution of critical materials and essential equipment. He said in part:

"I doubt if anyone in this room will support government control of industry after the war. However, in times of national emergency, when the future of all mankind hangs in the balance, when we are fighting for our way of life and when the demands for things to prosecute the war greatly exceed the supply, it seems that a government agency such as the War Production Board should take charge of vital materials and direct these materials to points where they will do the most good. In advocating this control, we must not lose sight of the important fact that if we don't lift these controls when the war is over, we will jeopardize, if indeed, we have not lost our free enterprise system.

"The establishment of the Mining Equipment Division of the War Production Board and the appointment of Director Arthur Knoizen, a former chairman of the Manufacturers Division of your Congress, in my opinion was one of the most important moves made by any branch of government. Mr. Knoizen's problem was to convince the policy-making group of the War Production Board that to win this war, your industry had to provide the necessary raw materials, and that to provide these vital materials, your requirements for mining equipment must of necessity be satisfied.

"If you have not already learned of it, I am sure you will be delighted to know that as of January 1, manufacturers of mining equipment will be given an AA rating for virtually all the equipment which you require, thus making it comparable with the military program.

"Since the life of the nation is dependent on the production of your industry, it follows that the fullest possible cooperation between the War Production Board, the mine operators and the manufacturers of mining equipment must be maintained. Working together, we can and will do the job, and to this end, the Manufacturers Division pledges to you its wholehearted cooperation."

The dinner speaker, Dr. C. J. Potter, Deputy Solid Fuels Administrator and Deputy Coal Mines Administrator, was introduced by Mr. Moses as follows:

"We are honored by having with us tonight a young man who is holding down two of the most important jobs in the Federal Government. He is well known to all of us, having previously served in Washington in the Bituminous Coal Division where he was personally responsible for much of the immense task of coordinating coal prices under the Guffey Act. More recently, he has been assistant to the president of the Rochester - Pittsburgh Coal Company, in Indiana, Pennsylvania. When the government took over control of the coal mines for the second time about a month ago, he was appointed as Deputy Solid Fuels Administrator and Deputy Coal Administrator. Thus he has the direct administrative responsibility in the extremely complex problems arising out of government operation of the mines, and also the responsibility for insuring proper distribution of our coal supplies to the places where it is needed."

Dr. Potter gave a straightforward talk on governmental administration of the coal mines, explaining the procedure to be followed by his agency and by the operating companies, and stressing the government's desire to have the mines returned to the owners at the earliest possible moment. His complete address is published on pages 25 to 29 of this issue. Following his address, Dr. Potter gave direct "off - the - record" answers to many questions from the audience on matters uppermost in their minds with respect to the present status and future prospects of the coal industry.

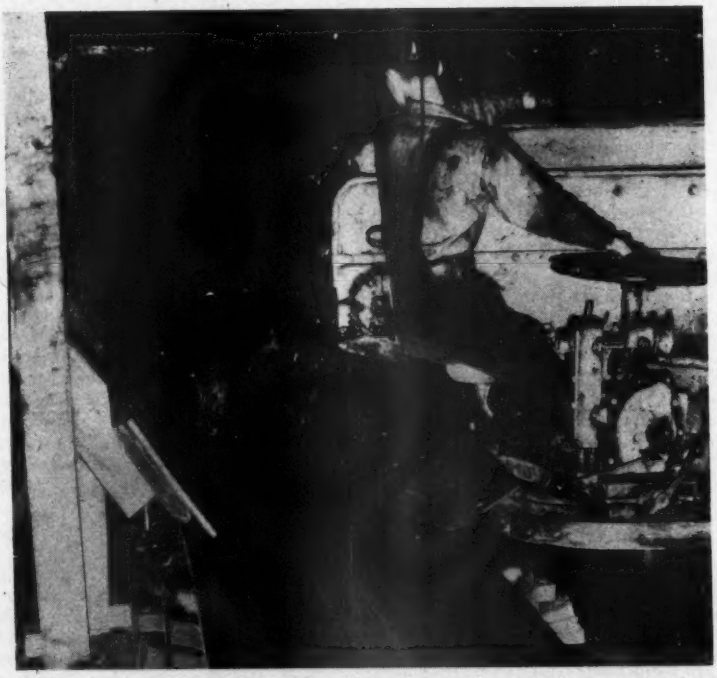
Shuttle Car Loading For Belt Conveyors

A Report of the Conveyor Committee, Describing Methods for Loading Belts Without Delaying the Shuttle Operation

A BELT CONVEYOR is solely a transportation unit and as customarily used underground for gathering service, is installed in an entry, delivering coal from the room necks to the main haulage, which may be a trip of mine cars or a main conveyor. In a mining system of this type, the loading at the face may be by hand shoveling onto a face conveyor or by mechanical loading into a conveyor or a shuttle car, but in either case the room unit, whether conveyor or shuttle car, serves as a link between the face and the entry belt. If the belt is to operate successfully, it must be loaded properly by this room unit and the success or failure of belt transportation-operation and maintenance—is to a large degree affected by the way in which the belt is loaded.

When a conveyor is used from the face to the room neck, the transfer is somewhat simple, although the feed onto the belt must of course be regulated to suit the belt-carrying capacity, and where several room units are in simultaneous operation, considerable care must be exercised to prevent over-loading and spillage. In addition, there is a problem caused by an abrupt change in direction and velocity of the flow of the coal from one unit to another, and this is taken care of to some degree by installing a curved chute at the end of the room conveyor.

When the belt is loaded by shuttle car, the problem becomes more complicated. The shuttle unloading rate is much greater than the usual belt capacity, and when the shuttle loads directly onto the belt, either the shuttle discharge must be slowed down, which causes an undesirable delay, or else the belt speed must be increased. A third plan is to have indirect belt loading by using a "surge" hopper or conveyor between the shuttle and the belt so that both can operate at normal rates. All these plans are being used and the report presented here gives descriptions of several methods now in operation.



Direct Belt Loading

Submitted by Carel Robinson

A NUMBER of installations have been made where the shuttle car loads directly onto the belt, and in these operations the belt is run at speeds of 400-500 ft. per minute; this permits the discharge of four-ton shuttle cars at an average of from 30-40 seconds.

In one mine, when a 26-in. belt was used, an attempt was made to discharge the shuttle cars at right angles to the belt. This caused serious abrasion. However, since only one loading machine was used, the shuttle discharge was changed to the end of the belt; in this case, the car runs up on a little ramp and loads into a chute. By this arrangement, the coal flow, when it leaves the chute, is in the direction of the belt travel, at approximately the same speed as the belt, and there has been very little abrasion.

At another operation, where two loading machines are used, it is necessary for one of the shuttle cars to discharge over the side of a 30-in. belt. At this mine, the coal is shot hard and there is a large amount of fines; the belt has a better grade of rubber covering and the abrasion here has not been serious.

Belt Loading With an Automatic Hopper

Submitted by V. D. Hanson

AN ORIGINAL belt loading device, of home-made design and construction, is used by a company for shuttle cars in a room panel which has in the entry, a 30-in. gathering belt conveyor, 1,800 ft. long running at a speed of 160 to 240 ft. per minute. In this panel, rooms and pillars are mined with a tractor mounted loading machine; the shuttles operate between the working faces and the room necks and as several places are worked simultaneously, it is necessary to have a number of separate belt loading stations on the entry. At the beginning, several attempts were made to load the belt with chutes; these varied from fixed position plates through cable suspended chutes but all proved unsatisfactory, with crowding and spillage. In order to overcome these undesirable features, an automatic hopper was designed by this company as shown in Fig. 1 and described in the following paragraphs.

Automatic Hopper

The device is an open-end hopper of steel construction which straddles the belt and is approximately 7 ft. long, 4 ft. wide at the top with the sides sloping down to a bottom opening 14 in. wide by 7 ft. long which centers on the belt. Through this opening the coal drops onto the belt which acts as a self-feeder to empty the hopper. The side plates, however, are not in a fixed position. Through a system of hinged levers and connecting rods the plates move forward and down to form the hopper when coal is being loaded at the station; when not in use, the plates swing up and away from the belt so as not to obstruct the passage of coal loaded at an in-bye station. Figure I shows the general construction and illustrates the open and loading positions, by solid and dotted lines, and also indicates the water spraying device, which is incorporated in the unit and operates when the sides are down.

The opening and closing action is automatically operated by the shuttle car. When the loaded shuttle comes to the hopper it pushes against a bumper rod marked G on the drawing, and by a slight forward travel it swings the plates into the loading position as shown by G^1 and the dotted lines. Through connecting rods, the opposite side follows this same motion. If the shuttle should accidentally over-run, each plate can move horizontally another 7 in. toward the center. The weight of the coal serves to hold the plates in the closed position until the hopper is emptied and as the shuttle car pulls away, the counter weight, W, swings the plates back into the open position. If when unloading, the operator should notice coal coming on the belt from an in-bye station, the shuttle car is backed away from the belt momentarily until the coal passes. About 40 seconds are required to unload the shuttle and this amount of coal covers about 200 lin. ft. of belt, with a belt speed of 240 ft. per minute.

The device is fastened to the belt conveyor structure by a clamping arrangement, marked A on the drawing, and no bolt holes are necessary. The loading aprons are quickly disconnected and the hopper "knocked down" by removing the clamps and pins; this frees all parts and two men can easily handle and transport the unit from place to place. No skilled help is necessary in moving and installing and about one hour is the time required by two men to set the unit in place.

Operating Results

At this mine five automatic hoppers are now in use and the management reports that they have been entirely satisfactory in loading the belt to proper capacity and without spillage. The chute takes most of the shock off of the belt and very little turbulence is noted at the point where the coal leaves the hopper. The management further reports that the hoppers have been free of trouble and that the maintenance is practically zero due to the fact that all fittings are very loose with plenty of clearance designed into all shaft and pin connections.

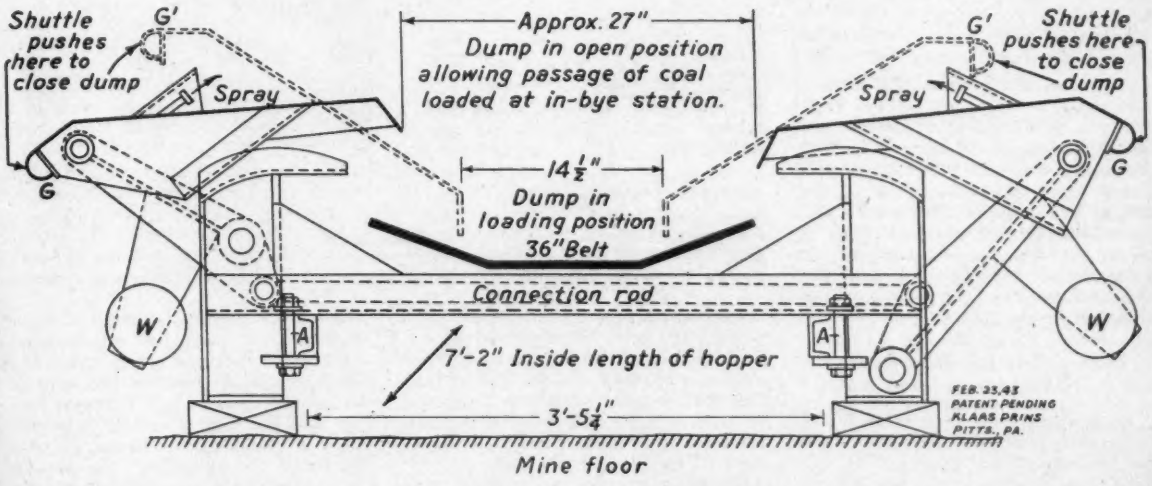


Fig. 1. Automatic belt loading hopper

Belt Loading With a Hopper-Conveyor

Submitted by P. R. Paulick

THIS REPORT will deal with a description and comparison of two systems of loading belt conveyors with rubber-tired shuttle cars, (a) unloading directly from shuttle car onto belt and (b) using a hopper-conveyor between the belt and shuttle car.

The mine is operating rooms and pillars in 42- to 44-in. seam of coal. At the working faces caterpillar mounted loaders are used with standard type rubber-tired shuttle cars which discharge onto a 30-in. belt located in center heading of a three-entry panel. The entries are driven on 50-ft. centers, 12 to 14 ft. wide, while rooms are driven on 80-ft. centers 24 to 26 ft. wide. Pillars are recovered with the mechanical loaders.

The mining system is half advance and half retreat. In other words, when a panel entry is started, only 300 ft. of belt is laid and one mechanical unit develops the entries while the second unit works rooms advancing on one side of the panel entry, according to the general plan as shown in Fig. 2. Entries are developed to a 1,200-ft. limit and then this unit too goes into room work, retreating on the opposite side.

Direct Belt Loading Proved Unsatisfactory

Each loading machine is served by two shuttle cars. At the beginning of the mechanization program at this mine, the shuttles unloaded directly onto the 30-in. belt and the original idea was to have the cars pass each other at the face or breakthrough nearest the face, so as to reduce to a minimum the amount of time the loader would wait for the empty. However, because of the inability of the empty shuttle to arrive at this designated point on schedule, due to the excessive time taken to unload the car directly onto the belt, the "passing point" was made at the breakthrough nearest the belt. This caused an undue delay to the loader and time studies and observations showed that the shuttle took anywhere from 0.8 minutes to 1.8 minutes to unload, depending on whether there was coal on the belt from the other unit.

All sorts of experiments were tried to reduce this delay; the belt speed of 200 ft. per minute was raised to 250 ft. a minute and later increased to 400 ft. per minute. While this speed-up helped the unloading time of the shuttle, it certainly created other problems which were just as undesirable or even worse—for instance, the dust situation at the belt head on the entry, caused by the high speed of discharging coal into the mine cars, became so bad that the belt had to be slowed down.

Description of Hopper-Conveyor

The whole problem was solved by installing a belt loading station for the shuttle cars, which consisted of an elevating conveyor that was specially constructed with a hopper large enough to accommodate the full shuttle load. This device is placed at right angles to the belt; the hopper rests on the mine floor and is approximately the length of the shuttle; the sides of the hopper slope in to a conveyor bottom and the outbye end of this conveyor is elevated to discharge onto the belt. In unloading, the shuttle car straddles the hopper and empties itself in the space of seconds instead of minutes and the hopper conveyor runs at a speed regulated to the belt capacity but yet fast enough to discharge its load completely before the next shuttle car arrives. To alleviate the fall of coal from the end of the elevator onto the belt, a flat steel plate, partially curved, was installed under the elevator head; this plate directs the flow of the coal parallel to the belt travel and has resulted in loading the belt with reduced shock and without spillage at this point.

TIME STUDY AVERAGES

Element	Units Per Cut	Shuttle Loading Onto Belt: Unit Time	Shuttle Loading Onto Belt: Time Per Cut	Shuttle Loading into Hopper-Conveyor: Unit Time	Shuttle Loading into Hopper-Conveyor: Time Per Cut
Tram with loader	1	5.14	5.14	5.14	5.14
Load buggie	10	2.17	21.70	1.64	16.40
Change buggie	10	1.85	18.50	1.27	12.70
Load rock	1	2.60	2.60	2.60	2.60
Total			47.94		36.84
Allowance for delays 15%			7.19		5.53
Total time per cut			55.13		42.37
Cuts per 7 hours			7.6		9.9
Tons per 7 hours			145.2		217.8

Time Studies Show Increased Efficiency

To illustrate the improvements resulting from this device the following tabulation gives a summary of time studies taken before and after the installation of the conveyor-hopper. However, for comparative purposes, the "unit times" shown are reduced to

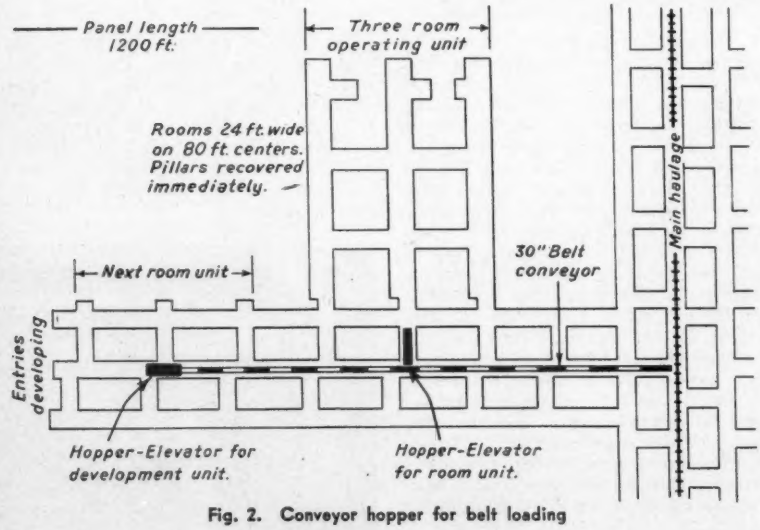
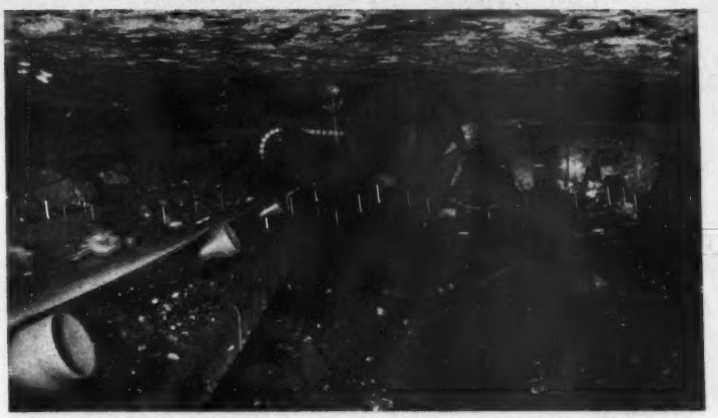

Panel length 1200 ft.
Three room operating unit
Rooms 24 ft. wide on 80 ft. centers. Pillars recovered immediately.
Main haulage
Next room unit
30" Belt conveyor
Entries developing
Hopper-Elevator for development unit.
Hopper-Elevator for room unit.

Fig. 2. Conveyor hopper for belt loading

average standard performance; and in order to eliminate all unusual and non-recurring interruptions, an average allowance for delays is assumed to be 15 percent in each case. The study is based on a room cut 7 ft. deep, 26 ft. wide in a seam 39 in. high and producing 22 tons of coal or 10 shuttle car loads, with 11 men.

It will be noted from these studies that after the installation of the hopper-conveyor, there has been a general over-all increase in the efficiency of the various operations, and while all of this is not directly attributable to the shorter round-trip time of the shuttle, there is nevertheless a direct reduction in the car change from 1.85 minutes to 1.27 minutes.



Belt Loading With an Elevating Conveyor

Submitted by E. H. Jenks

THE OPERATION described in this report, mines a retreating room panel with mobile track-mounted loaders and shuttle cars; the shuttles discharge onto an entry belt which takes the coal to the mine car haulage road. As shown in Fig. 3, the panel has two operating units, one on each side of the entries, and each unit consists of from four to five rooms.

Conveyor Mining

This same type of panel is also mined with room conveyors, and in this operation the belt loading has never been a problem even when as many as eight conveyors were feeding onto the belt. During the development work which advanced the three entries, with a total of nine face men, the belt is run at a speed of 150 ft. per minute; when the panel is changed to production, with eight room conveyors and 28 face men, the belt speed is stepped up to 200 ft. per minute. There has been a little trouble with overloading and to overcome this, the peak loads are regulated by the assistant mine foreman.

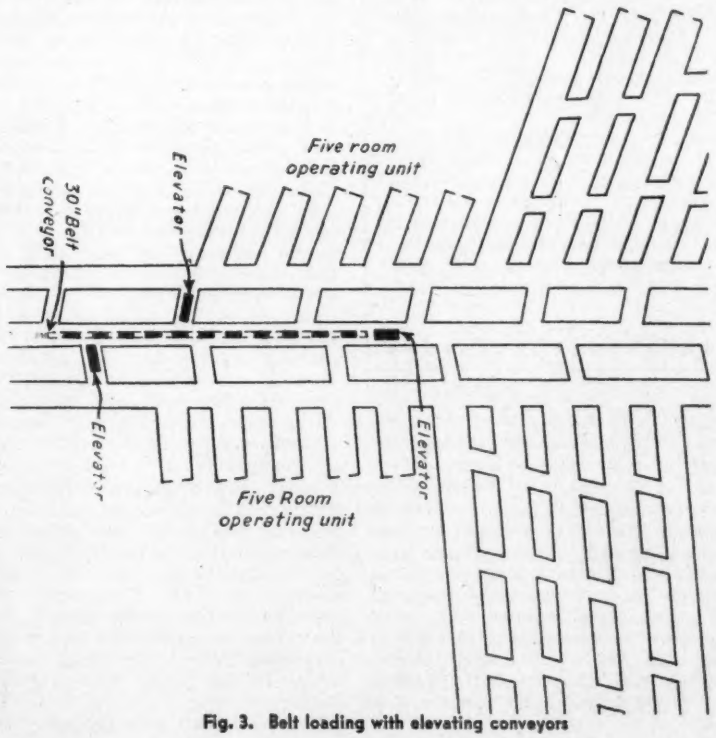


Fig. 3. Belt loading with elevating conveyors

Shuttle Car Operation

When shuttle car haulage was first introduced, trouble immediately developed with peak loads; the shuttle discharge rate is three tons of coal in 20 seconds and a 30-in. belt running at 200 ft. per minute has a rated capacity of 160 tons per hour, which is not quite one ton in 20 seconds. This caused coal spillage and delays in unloading the shuttle, so a correction was necessary.

It was the desire to avoid high belt speeds, so the belt was only stepped up to 250 ft. per minute, and elevating conveyors were installed for the shuttle loading. This elevator is a conventional manufactured type, self-contained in a steel frame with a conveyor that raises coal from the mine floor level and discharges onto the belt. The conveyor when completely filled for its entire length to the head end has a capacity equal to that of a shuttle car and can be operated at two speeds—a fast speed for emptying the shuttle and a slow speed for feeding on the belt. The unloading does not take much time; this fills the conveyor which, by push button control, is then slowed down to one-third speed, putting coal onto the belt at the rate of three tons a minute.

The panel has four shuttle cars and, as shown in Fig. 3, each side has a loading station. This has caused no conflict; the shuttle car runner does not start his elevator until he sees that his belt is clear, and by proper exercise of this precaution, the belt loading has proved very satisfactory.

Wheels of Government

As Viewed by A. W. Dickinson of the American Mining Congress

WITH THE President away in Africa and the Near East, the Congress pushed on with the Revenue Bill, the father-draft proposal, and other legislation in an effort to gain time for a Christmas vacation in the home districts. A storm appears to be gathering in the Senate Finance Committee where feeling on the part of the chairman and the members is strongly against Treasury proposals and there is evidence of intent to reduce the tax increases now carried in the bill as passed by the House.

On the important Committee on Ways and Means, Representative James P. McGranery of Philadelphia, now a Federal Judge, has been replaced by Representative Herman T. Eberharter of Pittsburgh, Pennsylvania, also a Democrat.

Tax Bill in Senate

Passing the House November 24 with only slight alterations from the form presented in our November issue, the $2 billion Revenue Bill was the subject of hearings before the Senate Finance Committee from November 30 to December 6. Treasury Secretary Morgenthau repeated the original Treasury request for a $10.5 billion bill, but members were resistant and inquired at length of the Secretary concerning a sales tax. He deprecated this form of taxation saying that after exemption of various items it would yield only around $1 billion.

General Counsel Randolph Paul criticized the complexities of the House bill and urged higher taxes on individuals; in the case of corporations, on which the House had increased the excess profits levy from 90 to 95 percent, he suggested increasing the corporate surtax stating that this procedure would produce more revenue.

Asking that a definition of "Gross Income from the Property" be placed in the law, Donald H. McLaughlin, a member of the AMC Tax Committee, urged that this be done to confirm the intent of the Finance Committee and the Congress when percentage depletion for mines was written into the law in 1932. He urged the committee to include in the bill the amendment by Senator Edward C. Johnson of Colorado which makes it clear that mining operations are considered as including ordinary treatment processes. The amendment applies the same principles to Sections 731 and 735 of the 1942 Act which exempt strategic minerals, above-quota production and excess output from excess profits tax.

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Washington Highlights

REVENUE BILL—Finance Committee now drafting.

"GROSS INCOME FROM THE PROPERTY"—Mining men ask definition in law.

WORLD RFC—Morgenthau announces another Reconstruction Plan.

SURPLUS PROPERTY—Disposal of war materials a problem.

CONTRACTS TERMINATION—Bernard Baruch called in to develop procedure.

FATHERS TO ARMY—Congress vests Selective Service policies in Gen. Hershey.

WAR LABOR BOARD—Approves Ickes-Lewis Wage Agreement.

OPA—Grants 17-cent coal price boost.

COAL OPERATORS-JOHN LEWIS—Resume negotiations for wage scale.

PORTAL-TO-PORTAL—Supreme Court agrees to review Iron Ore Case.

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American Zinc, Lead and Smelting Company Assistant Treasurer Clarence T. Burns asked for an amendment relating to non-taxable bonus income to remove difficulties of administration and interpretation, and F. O. Davis of the Potash Company of America opposed the termination of percentage depletion for potash at the end of the war as contemplated in the House bill. Senator Elmer Thomas of Oklahoma appeared later before an executive session of the Committee to ask adoption of his amendment which would strike Section 114 (d), the entire termination clause, from the bill; otherwise the minerals granted percentage depletion in the 1942 Act and in the pending bill would lose it after the cessation of hostilities.

Increase from one-sixth to one-half of the net income of new coal and iron mines exempt from excess profits tax was asked by Rolla D. Campbell appearing for the Marianna Smokeless Coal Company, who also requested that this treatment apply to taxable years beginning after December 31, 1941. National Coal Association Tax Committee Chairman Gordon G. Crowder stressed the need of authorizing the setting up of reserves for deferred maintenance. Senator Vandenberg of Michigan has asked the Committee to provide in the bill that all development costs at mining properties after initial discovery may be applied as direct or deferred charges to production.

AMC Tax Committee Chairman Henry B. Fernald summed up for the Finance Committee the views and recommendations of the mining industry developed over the past year through the AMC Committee. Reviewing the necessity for making good the exhaustion of present reserves he elaborated for the Senators as to: Gross Income from the Property; Non-taxable Bonus Income; Bonus Income from Slags and Residues; De-

velopment Expenditures for Mines; Net Income from the Property; Definition of "Mineral Property"; Undermaintenance and Underdevelopment; Accelerated Depreciation; Tax Benefit Rule for Depreciation and Depletion; Basis for Inadmissible Asset Adjustment; Excess Profits Exemption for Production from New Mines (including other mines as well as coal and iron); Excess Output Allowance for Lessors; Sec. 114 (d)—Termination of Percentage Depletion for Certain Minerals; Sec. 205—Reduction in Excess Profits Credit Based on Invested Capital; Sec. 202—Increase in Excess Profits Rate; Sec. 110—Denial of Deduction for Federal Excise Taxes; and Sec. 115—Acquisitions to Avoid Income or Excess Profits Tax.

Many able and forceful industrialists have appeared before the Committee in opposition to the renegotiation of war contracts statute. The Committee has heard testimony from the heads of the interested government agencies which apply renegotiation and it is quite likely that considerable change will be made in the existing statute.

Senator Vandenberg of Michigan announced that he will ask the Committee, of which he is a member, to defer the increase from 1 percent to 2 percent of employer-employe taxes for Social Security which otherwise would automatically go into effect January 1, 1944.

Awaiting the President's approval on his return is H. R. 3363 extending the time within which applications may be filed for Section 722 relief from excess profits tax, to permit filing up to three years from the due date of the excess profits tax return, or two years from any excess profits tax payment, with respect to the amount of that payment. The bill also extends to December 31, 1944, the date on which employes and similar pension trusts are to be brought into conformity with provisions of Section 165 of the 1942 Revenue Act. The conferees struck out the Senate amendment which would have extended the time for filing certificates for amortization of costs of emergency facilities.

Worldwide RFC

The International Stabilization Plan of Lord Keynes and the previously announced Treasury (White) Plan involving the use of "unitas" are now subject to consideration with a third plan, an informal outline of which has been presented to the Congress by Treasury Secretary Morgenthau. This third proposal calls for a $10 billion world RFC plan for which this country would put up approximately one-third of the money. A United Nations Bank for Reconstruction and Development would be created to function in the loaning of money to rebuild war-damaged areas and to maintain international business activity. Subscription of the $10 billion would bear relation to the national income and the volume of foreign trade of the participating nations, and it is stated that accounts would be kept in terms of "unitas."

Surplus Property Disposal

The Senate Committee on Expenditures in the Executive Departments has recently held hearings on the O'Leary bill, providing for the disposal of surplus war property, which passed the House on June 9. A number of witnesses have appeared asking for protection against government sales of surplus property after the war and it is expected that the bill may be reported to the Senate in the near future. It would set up a Surplus War Property Committee of five Senators and five Representatives to make a detailed study of anticipated surpluses in possession of the Government at the end of the war; thereafter the Committee is to report to Congress recommending any necessary additional legislation to carry out the purposes of the law. Provision is made for the disposition or destruction of surpluses under the control of the President, the Bureau of the Budget and the Procurement Division of the Treasury. Federal departments would be given first priority in allotment of material with second priority assigned to States, Territories and local political subdivisions; further disposition of surpluses to be made by sale or lease in domestic markets, to agencies of foreign governments, or in the open foreign markets. Requirement is made for competitive sales or leases preceded by full public notice unless this is considered contrary to the public interest.

Senator George's special committee on postwar policy has been conducting hearings on problems of disposing of surplus war materials and on contract termination. It has been indicated that a bill will be brought out setting up a central government agency to carry out the policies of Congress on postwar industrial demobilization.

War Contract Termination

Experienced veteran of war materials problems during and after World War I, Bernard M. Baruch is proceeding at the request of the President and Director Byrnes of the Office of War Mobilization, to coordinate views and develop uniform departmental and agency procedure on the termination of war contracts, the disposal of war surpluses, and the reconversion of industry to a postwar basis. The matter of war contract termination has been the subject of a heated controversy between Undersecretary of War Patterson and Comptroller General Lindsay Warren. Members of Congress have been calling for the creation of an independent agency to handle contract termination but it is believed by many that Mr. Baruch will be able to bring about the best possible procedure on this knotty problem without finding it necessary, as Judge Patterson has said, "to hire a watchman to watch the watchman."

Draft Fathers

Another bill awaiting the President's approval is that which would place pre-Pearl Harbor fathers at the bottom of the list of non-deferred men on a nationwide basis. A feature of the measure, to which WMC Director Paul McNutt has voiced vigorous opposition, is that which places control over draft policies, through the President, in the hands of Director of Selective Service Major-General Lewis B. Hershey. The bill eliminates the work-or-fight system of putting military age fathers into essential jobs or in the armed forces by establishing non-deferrable lists. With the exception of medical personnel, it is provided that no individuals shall be called for induction because of their occupation. Deferred registrants who have moved to jurisdictions beyond those of their local draft boards are to be reviewed by appeal boards having jurisdiction over the location of their new employment. Physical standards are to be re-examined to make better utilization of registrants classified as 4-F, and pre-induction physical examinations may now be had.

Coal Wage Negotiations

After the President had taken over the coal mines on the night of November 2 and ordered the men to return to work, the response was not immediate. Secretary Ickes and John Lewis agreed on a tentative contract between the Government and the miners on the night of November 3, and although Lewis then ordered the miners to return to the mines, much working time was lost during the week and production did not approach normal on a nationwide basis until November 8. The $1.125 increased pay approved by the War Labor Board was increased to $1.50 in the Ickes-Lewis agreement by reducing the miners' lunch period from 30 minutes to 15 minutes and paying for the additional 15 minutes of working time at time and one-half, amounting to 37½ cents.

Submitting the agreement to the War Labor Board, Ickes then appointed Charles J. Potter of Indiana, Pa., as Deputy Solid Fuels Administrator, vice Howard A. Gray retired, and also Deputy Coal Mines Administrator. Ickes also appointed two advisory committees, representing anthracite and bituminous operators, to advise and consult in the working out of details concerning conditions of work in the coal mines under Government possession in accordance with

the Ickes-Lewis agreement. On the anthracite committee are Major William W. Inglis, R. E. Taggart, and James Pierce. On the bituminous committee are Charles O'Neill, R. L. Ireland, L. Ebersole Gaines, Duncan Kennedy, D. A. Thomas, George Campbell, Kenneth A. Spencer and Eugene McAuliffe.

WLB approved the Ickes - Lewis agreement on November 12, with final approval as to wage payment procedure on November 20. Meanwhile, after request of the Board for a determination of the facts as to travel time, the President appointed Morris L. Cooke of Philadelphia, representing the public; R. L. Ireland of Cleveland for the operators; and Thomas Kennedy, secretary-treasurer of the UMWA, as a committee to pursue the study.

The application of the wage scale approved by WLB was explained by Deputy Coal Mines Administrator Charles J. Potter at the American Mining Congress Coal Division meeting in Pittsburgh on the night of December 3 in the following words:

"The interpretation approved by the War Labor Board allows the rate of $1 per hour for the full 8 hours of production time, and a rate of 66 2/3 cents per hour for the 45 minutes travel time for the first 40 hours of the week. This provides for a compensation of $8 per day for productive time under 40 hours and 50 cents per day for the 45 minutes travel time. For productive time after the 40th hour of the week the rate approved was $1.50, and 45 minutes of travel time it was $1 per hour."

Instructions were immediately issued on November 20 by Administrator Potter to all operating managers for the United States for bituminous coal mines, giving terms and conditions of employment effective in government operated mines as of November 3, and carrying detailed computations of compensation to be paid mine workers employed on a day-wage and tonnage basis and for outside employes, including strip mine and coke oven workmen.

During the week of November 22, wage negotiations were resumed between operators and miners but with some of the captive properties and the Southern Appalachian operators remaining away over the portal - to - portal issue. Former Senator Burke stated for the Southern operators that a case challenging the portal-to-portal requirement under the Wage and Hour Law is coming to the Supreme Court from Virginia. Also, on November 15, the Supreme Court agreed to review the case from Birmingham, Ala., involving the question of whether time spent by iron ore miners in underground travel is compensable under the Wage-Hour Act.

Meanwhile, many coal producers expressed disapproval of the OPA bituminous coal prices announced by Stabilization Director Fred H. Vinson, averaging increases of around 17 cents a ton, from a low of 10 to a high of 60 cents. No increase was granted to mines in Western Kentucky, Illinois, Indiana, the Southwest and Southern Colorado, with the exception of underground mines loading entirely by hand or shipping entirely by truck. By making a showing of substantial hardship wrought by the prices individual high-cost mines may apply further price increases.

In asking the operators and miners to negotiate an agreement in order that the mines may be turned back to private ownership, Ickes urged that they go ahead with the prices granted by OPA and seek higher prices at a later date when experience figures could be shown. The operators pointed out that the travel time averages more than the 45 minutes per day set forth in the Ickes-Lewis agreement. Southern operators stated that they are willing to sign a contract which would provide eight hours work each day actually mining coal, instead of the assumed eight hours under the proposal. Under a promise from Ickes that the government would not restore Southern coal mines to their owners until they joined in a general wage contract, John Lewis resumed negotiations on December 1 with an operators' committee consisting of George F. Campbell of Illinois, Charles O'Neill of Central Pennsylvania, R. L. Ireland of Ohio, Kenneth A. Spencer of Kansas City, Mo., and Harry M. Moses for the captive mines.

Transporting Lubricants

(*Continued from page* 47)

4 in operation. Two men constitute a greasing crew. All lubricating is done on the third shift, which means that each piece of mining equipment is lubricated after 14 hours' service; routine inspections of equipment are made in conjunction with the greasing. The company using this car maintains accurate records of the amount of lubricant used on each piece of mining equipment. These records are used in preparing cost reports and forecasting the mechanical condition of the equipment, as indicated by excessive consumption or loss of grease or oil.

The upper half of Fig. 5 is a diagram of a special car used to transport 3- and 5-gallon grease and oil cans into the mechanical sections. The cans are filled outside, placed on the car, and taken inside the mine where the filled cans are exchanged for empty ones. Then the lubricant car and empty cans are taken outside. This system eliminates the need for storing more than a one-day supply in the mine. It is recommended that this car be covered and provided with a lock; also, that fireproof facilities be provided for storing the small containers in the mechanical section.

The lower half of Fig. 5 is a diagram of a car used to distribute grease and oil daily to the mechanical sections. The lubricants are transferred into 5-gallon, spillproof metal oil cans housed in fireproof boxes near each mechanical unit. The machine operators procure lubricants for their mining equipment from this fireproof grease-storage box. The only grease that is not housed in a fireproof container is approximately 20 lbs. kept near each loading machine in a pressure-type can.

Transportation facilities such as those outlined make it unnecessary to store large amounts of oil and grease inside coal mines. The grease cars should be kept outside the mine except when in use. They should be kept covered and locked, and one person should be definitely responsible for filling and transporting the lubricant containers. The cars should be equipped with fire extinguishers and rock dust. Greasing should be done by regular greasers or mechanics working on the off shift or between shifts, whenever possible, thereby making it unnecessary to keep lubricants near machinery that is in operation.

In smaller mines that operate only a few units of mechanical equipment the expenditure for elaborate grease-transportation facilities might not be warranted. However, spillproof oil cans and approved-type grease guns of one-shift capacity should be provided, and they should be dispensed from an outside grease house at the beginning of each shift and returned at the end of the shift. Such containers can be transported by the machine runner or operator. If proper care is taken and they are handled in the manner described only enough lubricants for one shift will be stored in the mine.

WPB Relaxes Restriction on Tin Content of Solder

ON November 3 the War Production Board issued General Preference Order M-43, as Amended, relaxing restrictions on the tin content of solders where it has been found that higher tin content is necessary. Previously this higher content could be used only upon the granting of appeal. But under the amended order specific provisions permit higher tin content, in some cases above 21 percent, for certain solders, thus reducing paper work.

PERSONALS

George B. Harrington, president, Chicago, Wilmington & Franklin Coal Co., was awarded the 1944 William Lawrence Saunders Gold Medal, for "distinguished achievement in mining," at a meeting of the board of

GEORGE B. HARRINGTON

directors of the American Institute of Mining and Metallurgical Engineers held October 19. Mr. Harrington is the fourteenth recipient of this award, which was established in 1927.

The 1944 award will be formally presented to Mr. Harrington at the annual meeting of the institute in New York City in February, 1944.

Dr. Leo Lehr Carrick, since 1927 dean of the School of Chemical Technology of North Dakota Agricultural College at Fargo, has been appointed director of red-lead research and consulting chemical engineer of the Lead Industries Association. He will make his headquarters at the Association's office at 420 Lexington Avenue, New York City.

Andrew Leith resigned on October 16 as chief of Ferro-Alloy Branch of the Steel Division, WPB. He will be succeeded by **M. T. Metzger** as acting chief of the branch. Mr. Metzger is a metallurgist of the Bethlehem Steel Co. who has been dealing with ferro-alloy problems for the past two years.

Harry La Viers, vice president, South-East Coal Co., was elected president of the Big Sandy-Elkhorn Coal Operators' Association at the annual meeting October 8 in Ashland, Ky. **B. F. Reed**, secretary-treasurer of Turner Elkhorn Mining Cos., was elected vice president; **M. H. Forester**, vice president of Western Division, Consolidation Coal Co., was elected treasurer; and **H. S. Homan** was re-elected secretary.

Worthen Bradley, president, Bradley Mining Co., San Francisco, recently spent some time at the Goldbanks quicksilver mine in Pershing County, Nev., from which his company is trucking high-grade ore to its treatment plant at the Opalite property in Oregon.

David H. Devonald has been elected vice president in charge of operations of the Peabody Coal Co. He will direct the operation of all the company's coal mines, located in Illinois, Indiana, Kentucky, and West Virginia. Associated with the company continuously for 28 years, he had been general superintendent since May 1, 1941.

B. P. Manley, executive secretary of the Utah Coal Operators' Association, has been chosen chairman of the advisory council of the Salt Lake City Chamber of Commerce.

On November 10, **Charles J. Potter**, of Indiana, Pa., was appointed Deputy Solid Fuels Administrator, succeeding **Howard A. Gray**, who resigned following ten years' service in the Department of the Interior. Mr. Potter was simultaneously appointed Deputy Coal Mines Administrator, the post which was held by **Carl E. Newton** during the first period of Government ownership of the mines.

M. M. Rosenberg, assistant comptroller of the American Smelting & Refining Co., New York, and **John D. Clouse**, controller of Walter Bledsoe & Co., Terre Haute, Ind., have been elected to membership in the Controllers Institute of America.

Robert H. Ridgway has joined the staff of Union Mines Development Corporation, New York, as mining engineer. Formerly Mr. Ridgway was associated with the U. S. Bureau of Mines.

Richard C. Sickler has been appointed advertising manager for the Explosives Department of E. I. du Pont de Nemours & Co., Inc. Mr. Sickler is located in the Nemours Building, Wilmington, Del.

Chester Alan Fulton, President of the Southern Phosphate Corporation of Baltimore, Md., has been elected president of the American Institute of Mining and Metallurgical Engineers for 1944.

Charles E. Marr, of Spokane, was elected president of the Northwest Mining Association at the recent annual meeting of that body.

G. K. Hayes, who has represented the John A. Roebling's Sons Company, manufacturers of wire rope and wire, Trenton, N. J., as a salesman out of the company's Cleveland branch for several years, has been appointed assistant manager of that branch.

Mr. Hayes is a graduate of the University of West Virginia and has been connected with the company since 1930.

Samuel H. Willston, vice president of Horse Heaven Mines, Inc., and Cordero Mining Co., has been made a member of the Oregon State Board of Geology and Mineral Industry.

T. O. McGrath has become associated with the Control Mines Co., Oracle, Ariz. He was formerly manager of the Shattock-Denn Mining Corporation, from which he retired several years ago.

H. N. Eavenson, consulting engineer, Pittsburgh, Pa., was reelected president of Bituminous Coal Research, Inc., at a meeting of the board of directors on October 15 in Cleve-

H. N. EAVENSON

land, Ohio. Other officers, also re-elected, include **R. H. Sherwood**, Central Indiana Coal Co., vice president; **M. L. Garvey**, Pocahontas Fuel Co., treasurer; **C. A. Reed**, National Coal Association, secretary; and **J. F. Hanley**, National Coal Association, assistant secretary and treasurer. **J. B. Morrow**, president of the Pittsburgh Coal Co., was elected a vice president, replacing John A. Howe, deceased.

Harvey L. Tedrow, general manager of London Mines Co., has been appointed to serve on the Mineral Resources Board. He replaces the late F. D. Willoughby.

Alvin J. Herzig, chief metallurgist of Climax Molybdenum Co., has taken over the duties of vice president in charge of research. He succeeds **W. P. Woodside**, recently resigned.

Howard J. Thomas, Birmingham, Ala., has resigned from the Alta Coal Division of the Southern Cotton Oil Co. and the Consolidated Coal Co. to become area distribution manager for the Solid Fuels Administration for War, District 13.

W. Wyman Koons was recently appointed assistant manager of industrial relations for Oliver Iron Mining Co. at Duluth, Minn.

Stanly A. Easton, president of Bunker Hill and Sullivan Mining & Concentrating Company, was guest of honor at the dinner which concluded the 49th Annual Meeting of the Northwest Mining Association in Spokane, December 3 and 4. **Francis A. Thom-**

STANLY A. EASTON

son, president, Montana School of Mines, was toastmaster and the speakers who joined in paying tribute to Mr. Easton were **J. J. Carrigan**, Butte, Mont.; **E. A. White**, Tacoma, Wash.; **Leo J. Hoban**, Wallace, Idaho; and **Joe Drumheller**, Spokane, Wash.

Thomas C. Cheasley, supervising engineer of the Federal Bureau of Mines' National Fuel Efficiency Section and for 13 years fuel engineer for the Sinclair Coal Co., has been named to the National Fuel Efficiency Council. Other members are: **O. F. Campbell**, Sinclair Refining Co.; **C. F. Hardy**, Appalachian Coals, Inc.; **L. S. Reagan**, Webster Engineering Co.; **C. A. Reed**, National Coal Association; **H. J. Rose**, Anthracite Industries, Inc.; **R. A. Sherman**, Battelle Memorial Institute; **A. W. Thorson**, Solid Fuels Administration for War; **J. E. Tobey**, Upper Monongahela Valley Association; and **J. F. Barkley**, Federal Bureau of Mines.

Noble D. House was recently appointed district manager of the Portable Lamp & Equipment Company of Pittsburgh, Pa., for the States of Kentucky, Tennessee, Illinois, and Indiana. Mr. House will make his headquarters at Harlan, Ky.

Paul M. Barlow resigned his position as electrical engineer in the State Department of Mines of West Virginia on October 1 to join the staff of the Carbide & Carbon Chemicals Corporation as electrical engineer in the mechanical test, inspection, and fire-protection department, at South Charleston, W. Va.

Harold J. MacDonald was recently appointed to the position of manager of jobbing sales, wire and cable department, United States Rubber Co. Mr. MacDonald, a World War veteran, has been with the company since 1920. He was eastern district sales manager of the wire and cable department since 1938.

— *OBITUARIES* —

Frank F. Jorgensen, of Fairmont, W. Va., died Sunday afternoon, November 7, at the Fairmont General Hospital, following a brief illness caused by a throat and heart condition. Interment was at Oskaloosa, Iowa.

Mr. Jorgensen was well known throughout the coal industry and had been prominent in coal affairs. At the time of his death he was labor commissioner for the Northern West Virginia Coal Operators Association, but his previous connections were with Consolidation Coal Co. and Monongahela Rail & River Co., both of West Virginia, and the Superior Coal Co. of Illinois. He was a graduate mining engineer of Iowa State University; past president of the West Virginia Coal Mining Institute; member of American Mining Congress, American Institute of Mining and Metallurgical Engineers, and other coal organizations.

D. J. Shelton, president and general manager of The Marion Steam Shovel Company, died suddenly at his home in Marion, Ohio, on Saturday, November 27. Death was due to a heart attack.

Mr. Shelton, better known as "Doc" to his business associates and friends, had been president and general manager of The Marion Steam Shovel Company since October 16, 1941.

He joined the company in 1909, shortly after his graduation from Ohio State University, as a shop maintenance man. Because of his engineering talents he was shortly appointed assistant chief engineer, which position he held for five years when he became chief engineer. Two years later he became vice-president in charge of sales and engineering, from which post he went into the presidency.

Mr. Shelton was a member of the board of governors of the Manufacturers Division of the American Mining Congress.

Edward Pellew Arthur, 73, Colorado State Commissioner of Mines, died in October as the result of injuries suffered in an automobile accident.

Homer Littlefield, 66, manager, mining department, Marion Steam Shovel Co., died suddenly October 17

at his home in Columbus, Ohio. His first position after graduation from Massachusetts Institute of Technology was in the testing department of General Electric Co. Later he joined the commercial division of the power and mining department; in 1924 he became associated with the Marion Steam Shovel Co. as manager of the mining division, which position he held at his death.

Ernest C. Lane, 68, president of the Swansea Development Co., near Bouse, Ariz., widely known in mining camps of the West, died on October 20 in Phoenix, Ariz. A native of Indianapolis, Ind., Mr. Lane entered Arizona 32 years ago after having engaged in mining at Faye, Nev., and in British Columbia, Colorado, and Utah.

Following a brief illness, **George W. Long**, 72, known in mining circles since 1900, died in Phoenix, Ariz., on October 28. He came to Arizona in 1900 as superintendent of the Bisbee Extension mine, and in 1913 participated in the development of the Arizona Eastern gold mine at Oatman. He was born in Colorado City, Colo., and spent a large part of his life in boomtowns, including mining camps in Alaska.

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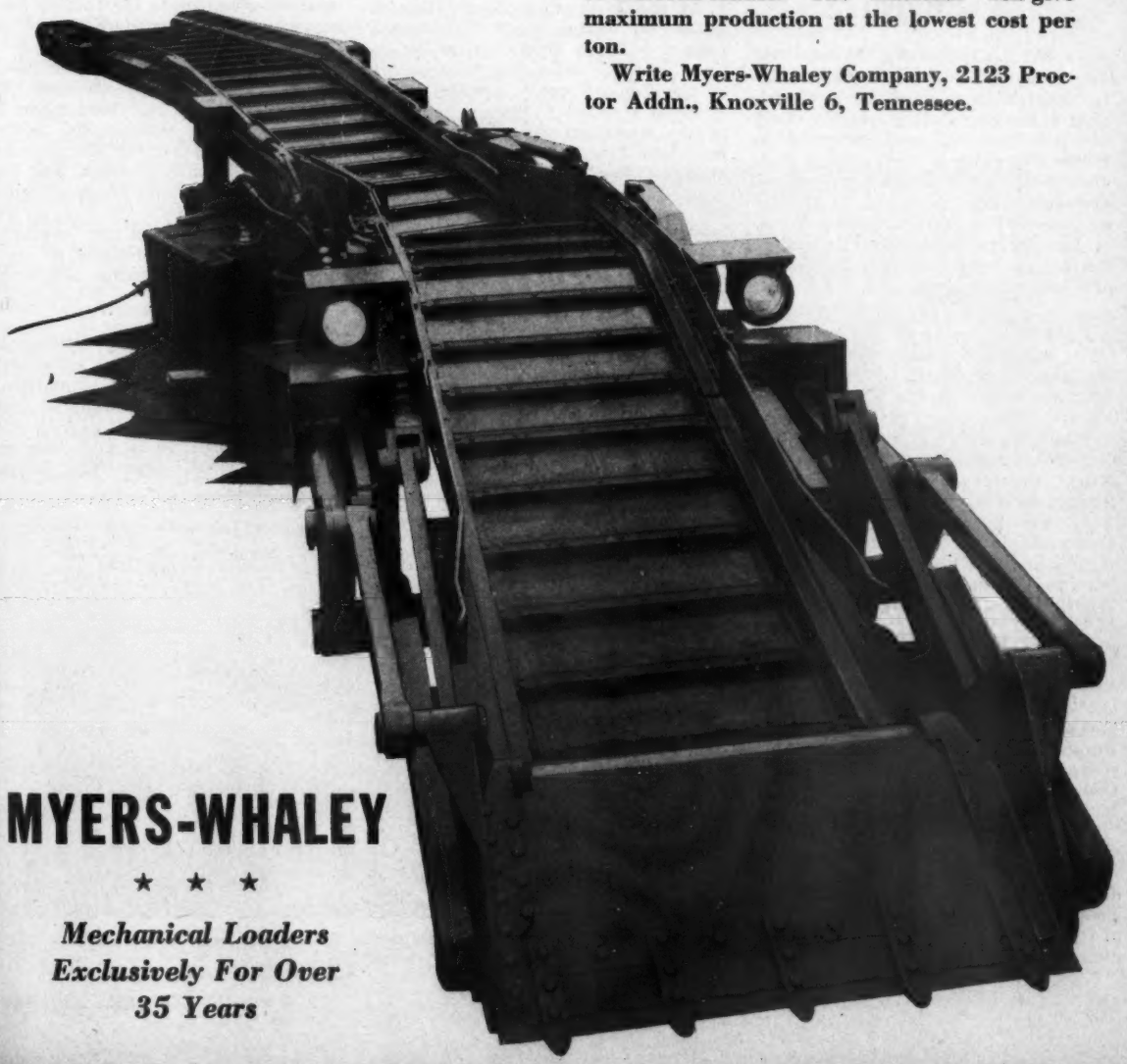

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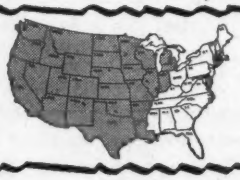

PENNSYLVANIA

»»» M. E. Yurkovsky, Bloomsburg, recorded in the Schuylkill County Court a lease from the Philadelphia & Reading Coal & Iron Company for 816 acres of coal property in Porter Township in the Tremont area. The Kalmia Coal Company whose president is Mr. Yurkovsky, will start to develop the property estimated to contain several million tons of coal in the Lykens seam long known for its excellent burning quality.

»»» The Galvanizers Committee, which is sponsored by the American Zinc Institute, had a wartime conference at the William Penn Hotel in Pittsburgh, Pa., on Wednesday and Thursday, November 17 and 18. The meeting, according to E. V. Gent, secretary-treasurer, was the largest on record.

At the first session, under the chairmanship of Robert Stoker, Carnegie-Illinois Steel Corporation, members were addressed by N. E. Cook, Wheeling Steel Corporation; K. J. T. Ekblaw, of the American Zinc Institute; Robert J. Ritchey, Carnegie-Illinois Steel Corporation; and D. A. Russell, Youngstown Sheet & Tube Co. Mr. Ekblaw discussed "Future Markets for Galvanized Sheets in Rural Markets," and Mr. Ritchey spoke on the subject of "What Will Consumers Demand in the Industrial Markets?" Mr. Russell's subject was "Preparation of Steel Surfaces for Galvanizing."

The afternoon session was addressed by C. W. Ridge, of E. I. du Pont de Nemours & Co., on the "Use of Cyanide Treatment Prior to Galvanizing."

At the Wednesday dinner Russell J. Greenly, acting chief of personnel, Carnegie-Illinois Steel Corporation, as guest speaker discussed "Leadership on the Home Front." Invited guests included Howard I. Young, president of the American Zinc Institute, the American Zinc, Lead & Smelting Co., and also director of the WPB Minerals Bureau; and Myron L. Trilsch, the latter on the staff of the WPB Zinc Division.

The program on Thursday morning included talks by N. E. Cook on "Steel for Galvanized Sheets After the War"; by Robert Stoker, Carnegie-Illinois, on "Tin in Galvanizing—What Have We Learned?"; and by W. E. Buck, Continental Steel Corporation, on "Lead Coatings—History—Present Practice."

The final afternoon session, under chairmanship of C. K. Lytle, Tennessee Coal, Iron & Railroad Co., was devoted to discussions on the post-war picture of electro-galvanizing versus electroplating of metals in competition with galvanized sheets.

»»» Definite efforts were made by the semi-official Pennsylvania Anthracite Committee during November to decelerate the bootleg mining industry. Its order to suspend activities by November 30 resulted in many conferences between the interests involved, and appeals from the miners. Progress has been made in reducing bootleg mining, due to the draft requirements, the demand for miners in legitimate mines, and the shift to defense plants where a higher wage rate prevails.

There are now 2,000 men employed in the bootleg coal industry as compared with 12,000 during March of 1941.

»»» Minimum quality standards were established for anthracite coal by the Solid Fuels Administration to prevent sub-standard fuel from reaching the consumer. The standards were: 15 percent ash by volume for the broken, egg, stove,

The main store building and service station of the Inland Steel Company, Wheelwright, Ky.

chestnut, and pea sizes; 16 percent ash in No. 1 Buckwheat; and 17 percent ash in No. 2 Buckwheat. The order will do much to deter the shipments of low-quality coal by a certain class of operators.

»»» Governor Martin's committee on Stream Pollution reports a shortage in help necessary to tabulate the results of a questionnaire having to do with the pollution of the Schuylkill River by anthracite mines, municipalities, and industrial plants located in its watershed. Much interest is evident concerning the recommendation of the five-man committee charged with the solution of the problem.

»»» Difficult, indeed, were the conditions under which the industry operated during November. On November 1, the Government again took over the operation of the mines because of the strike; and on November 8, the heavy rains shut down many mines especially in the Lehigh and Schuylkill areas. Under these conditions, the production during the first half of November was just under a million tons instead of the normal two and one-half million tons.

»»» Although some details of the WLB's anthracite award are not entirely clear, these are the principal terms: an increase of 32.2 cents per day for each mine worker to accord with the Little Steel formula, an increase in vacation pay from $20 to $50 per year, necessary tools to be furnished without charge, and a reduction of the 30-minute lunch period to 15 minutes with an additional compensation of 37.8 cents for the 15 minutes of work then done. No directive was issued concerning the portal-to-portal pay. On November 17, R. E. Taggart of the Wage Negotiating Committee addressed a general meeting, held in Hazleton, regarding back pay and the terms of the award.

»»» Toward the end of November no word came from the OPA about an increase in the selling price of anthracite coal. Many mining companies believe it will be obligatory to suspend operations in the event no satisfactory price increase is granted to meet the wage increase and the back pay requirements.

»»» Anthrafilt, the well known filter material made from specially prepared small sized anthracite shows a marked increase in sales. For the first nine months of 1943, sales were 44 percent above a similar period in 1942. Shipments have been made to Russia and Mexico for conditioning water used in steam plants.

MARYLAND

»»» A series of night mining classes are now being conducted in the Western Maryland coal fields. L. C. Hutson of Kitzmiller is instructor. Meetings are being held at Crellin, Kempton and Kitzmiller in Garrett County, and in Barton and Finzel in Allegheny County.

»»» The Lewis-Chambers Construction Company, New Orleans, La., has started stripping coal near Gorman, Garrett County. A small dragline and a bulldozer are being used.

»»» Two stripping operations are under way in Allegheny County, one by George F. Hazlewood, contractor, who is stripping the Big Vein Coal near Midland. A bulldozer and two dragline shovels are being used. Another stripping operation in the same county is being directed by the Industrial Coal Company, working the Big Vein outcrop near Carlos.

KENTUCKY

»»» The annual first-aid and mine-rescue contest sponsored by the Big Sandy Elkhorn Mining Institute was held on October 2 and 3, 1943.

The mine-rescue contest was held with four teams competing, Inland Steel Co.'s team from Wheelwright, Consolidation Coal Co.'s teams from Jenkins and McRoberts, and the Koppers Coal Co.'s team from Weeksbury.

The Inland Steel Co.'s team, consisting of A. E. Corder, Capt. W. A. Pack, Elmer Layne, Garland Huff

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and Howard Holbrooks, with J. P. Hensley as patient, won first place and was awarded $150 and a silver cup.

The first-aid event was held on October 3 in the white men's section. Keen competition was provided by 14 teams from the various coal companies and was won by the South-East Coal Co.'s team from Seco, Ky. Inland Steel Co. was represented by a team consisting of Roy Conley, Capt. Alton Roy, Roy Butcher, Earl Hughes, Gaston Ducote and Jack Blair patient, and finished in eighth place.

Inland's colored team was made up of Charles Hayes, captain; W. S. Powell; L. V. Thornton; Tom Slaughter; John Henry; and N. Powell, patient.

NEW YORK

»»» Clifton E. Mack, Director of Procurement, United States Treasury Department, spoke at the annual luncheon meeting of the American Standards Association, held Friday, December 10, at the Hotel Roosevelt, New York. His address dealt with using standards to bring Government requirements more nearly into line as a part of the American industrial system. Mr. Mack is in charge of all Government lend-lease purchasing.

This meeting marked the twenty-fifth anniversary of the founding of the American Standards Association. Started as a result of the production problems of the last war, the Association has in the past year completed more than 40 emergency jobs for the armed services and industry, and is engaged on many others.

R. E. Zimmerman, president of the organization, gave a brief address on post-war changes and developments.

H. S. Osborne, chairman of the Standards Council, reported on the year's work.

ALABAMA

»»» In the coal mining sections, mining operations are approaching normal. While there are some mines still down waiting for a definite understanding of the present wage situation, it is expected that this will be cleared soon and normal production will again be reached.

»»» With the resumption of coal production and relighting of furnaces that were down, the mining of iron ore has been resumed and practically all mines are in operation. One of the older red ore mines of the Birmingham district, the Raimund mine of the Republic Steel Corporation, which has been in operation for more than 40 years, has been closed down permanently. Most of the employes have been transferred to their Spaulding mine, which has recently been reconditioned and equipped with modern, up-to-date machinery and is being operated along modern and progressive lines.

National Safety Council Appoints Members for Coal Mining Section

THE National Safety Council announces the following officers for the Executive Committee of the Coal Mining Section for the year 1943-44:

General Chairman, Thomas Moses, Koppers Building, Pittsburgh, Pa.

Vice Chairman, J. T. Ryan, Jr., general manager, Mine Safety Appliances Co., Pittsburgh, Pa.

Secretary, R. H. Nicholas, chief inspector, Pittsburgh Coal Co., Pittsburgh, Pa.

Labor Representative, Dr. Walter N. Polokov, United Mine Workers of America, Fairfax Station, Va.

Mine Operators' Representatives, John E. Jones, safety engineer, Old Ben Coal Corp., West Frankfort, Ill.; Edgar C. Weichel, assistant general manager, Hudson Coal Co., Scranton, Pa.

Mine Inspectors' Representatives, J. J. Forbes, supervising engineer, U. S. Bureau of Mines, Washington, D. C.; C. L. Lutton, safety director, H. C. Frick Coke Co., Pittsburgh, Pa.

News Letter Editor, E. H. Denny, U. S. Bureau of Mines, Pittsburgh, Pa.

Engineering Committee Chairman, A. D. Sisk, safety director, Big Sandy-Elkhorn Coal Operators Assn., Pikeville, Ky.

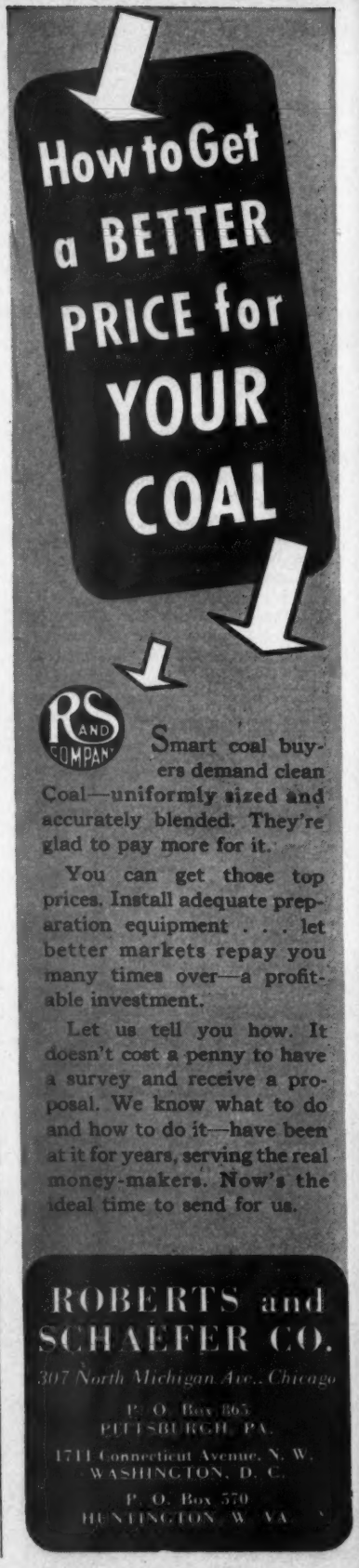
Entertainment Committee Chairman, J. T. Ryan, Jr., general manager, Mine Safety Appliances Co., Pittsburgh, Pa.

Film Strip Committee Chairman, Robert M. Medill, director, State Department of Mines and Minerals, Springfield, Ill.

Membership Committee Chairman, Cadwallader Evans, Jr., vice president and general manager, Hudson Coal Co., Scranton, Pa.

Poster Committee Chairman, Richard T. McAllister, United Mine Workers of America, District 12, Duquoin, Ill.

Program Committee Chairman, J. J. Forbes, supervising engineer, U. S. Bureau of Mines, Washington, D. C.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Central States

MISSOURI

»»» The Dalite Mining Company has completed the development of an open-pit mine on the Harder land, south of Alba, Mo., and has started milling ore from the mine in the former Berkey small tailing retreatment plant, which has been rehabilitated and enlarged. H. J. Bradley, of Webb City, is manager.

Two power shovels will be used in the open-pit mine. Loading and hauling of the ore to the mill has been let to the Briscoe Contracting Company.

MINNESOTA

»»» Consolidated net income of $1,113,477 after all charges, including interest and provision of $640,312 for Federal taxes, is reported for the third quarter of 1943 by The M. A. Hanna Company, Cleveland. This is equal after preferred dividend requirements to 93 cents a share on the 1,016,961 common shares. In the corresponding quarter last year net income was $1,080,307, or 90 cents a common share, and Federal tax provision was $572,345. Net income for nine months of 1943 amounted to $2,998,805, equal to $2.47 a common share, while provision for Federal taxes was $1,859,425. In the corresponding period of 1942 net income was $2,915,036, or $2.39 a common share, while provision for Federal taxes was $1,362,924.

MICHIGAN

»»» The Antrim Iron Company which has been making charcoal, pig iron, wood chemicals, and lumber since 1886 shut down their blast furnace and chemical works this fall. Sawmill operations will be carried on until they have finished cutting the timber owned by the company. This company, located at Antrim, Mich., in the northern part of the Southern Peninsula of the State, has been using Lake Superior ore in their furnace, much of it coming from the Michigan mines in the Northern Peninsula. The vice president of the company, J. P. Palmateir, said that it was possible that their plant might be dismantled and moved to Mexico or South America.

»»» The Oliver Iron Mining Company has exhausted the ore body at the Holmes-Section 16 mine at Ishpeming and are now driving a drift to the old Lake Superior Hard Ore mine which joins the Holmes property on the northeast. The Lake Superior Hard Ore mine is one of the group of mines operated in the early days by the Lake Superior Iron Company which was later taken over by the Oliver Iron Mining Company, the iron mining division of the U. S. Steel Corporation. The Hard Ore has a record of production from 1899 to 1914 of approximately 900,000 tons but prior to 1899 the production from this property was included with the figures of the other mines in the so-called Lake Superior group. These other mines were the Hematite, Section 16 and Section 21 properties. During the early years of the operation, the Hard Ore mine produced the standard non-Bessemer ore but during the latter years most of the ore shipped was of the siliceous grade.

The old workings of the Hard Ore mine had been under water for years and the first step in the rehabilitation of this property is the dewatering of the old workings. This will be completed before the drift from the Holmes shaft reaches the Hard Ore property.

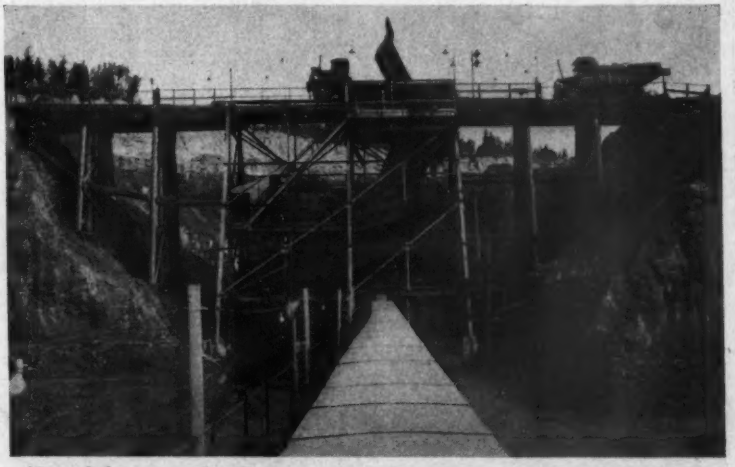
»»» The Centennial mine of the Calumet and Hecla Consolidated Copper Company is being unwatered preparatory to the mining of copper. This property, on the Kearsarge Lode, is located near the city of Calumet. This mine was opened to the 37th level in No. 1 Shaft, to the 43rd level in the No. 2 Shaft. A drift along the lode from the 43rd level of No. 1 Shaft, North Kearsarge which is at a lower elevation than the Centennial 43rd level, is connected with the No. 2 Centennial Shaft by a raise.

»»» The Inland Steel Company has announced the closing of the Ravenna - Prickett operation in the Crystal Falls district. This property was opened in June, 1939, and before the property could be stripped it was necessary to move Brier Hill creek which was above the ore body. The first ore was shipped in August, 1940. Early in 1941 a shaft was sunk to reach some of the ore not available to the open pit and during this past year the production came from underground operations.

»»» The Inspector of Mines for Gogebic County, Mich., has issued a report for the year ending September 30, 1943. In this past year the Michigan mines on Gogebic Range have produced 4,644,690 tons of iron ore. The total number of man days was 612,343 giving the tons mined per man day of 7.585 tons. The mining inspector also reports that there has been only one fatal accident during this period.

ARKANSAS

»»» Quartz crystals suitable for making radio oscillators, needed for military purposes, have been found in western Arkansas. Quartz crystal deposits have long been known to occur in western Arkansas, and the crystals have been mined for curio quartz in a desultory manner during the past 40 years. In the past year, however, interest in the deposits has been greatly stimulated because of the pressing need for high-quality



View of the screen plant from conveyor gallery at the iron mining operations of Butler Brothers, Cooley, Minn.

quartz, and the deposits have been made the object of an intensive study by the Geological Survey, W. E. Wrather, director, as a part of its widespread search for domestic sources of quartz for oscillators. Mining operations were begun during the winter of 1942-43 by the Metals Reserve Co. of the Reconstruction Finance Corporation, and since then the Diamond Drill Carbon Co. and a number of local operators have entered the field.

Iron Ore Shipments Reach New High

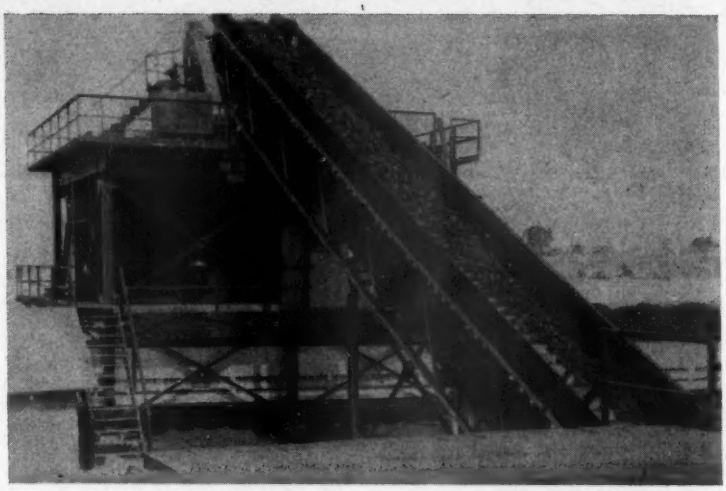
IN OCTOBER, as the Great Lakes navigation season approached what Joseph B. Eastman, director of the Office of Defense Transportation, has called its "critical period," more than 11,500,000 gross tons of iron ore were transported on the Lakes in vessels of U. S. registry. This movement set a new October record for iron ore.

October's 11,612,542 gross tons of iron ore exceeded by nearly 200,000 tons the corresponding month's tonnage in 1942 and brought to 76,784,357 gross tons the cumulative 1943 ore movement.

Coal dumped up to October 25 totaled 39,645,172 net tons for the season, or within 2,000,000 tons of the corresponding date's cumulative total for last year.

This year's records to date, achieved in the face of the worst weather conditions and latest season opening encountered in years, were made possible, in the opinion of ODT officials, only by the fine cooperation of vessel operators, Government manpower agencies and labor on the Great Lakes.

Citing the 9,515,643 gross tons of ore yet to be moved to fulfill the season's quotas and an estimated 850,000 net tons of coal in cars at Great Lakes ports ready to be moved when coal shipments are unfrozen, the ODT stressed the necessity of continuation of the most faithful efforts to move the essential amounts of grain, ore and coal before the season's end.



Transfer hopper and conveyor for sizing the coal, Enos Coal Mining Co., Illinois

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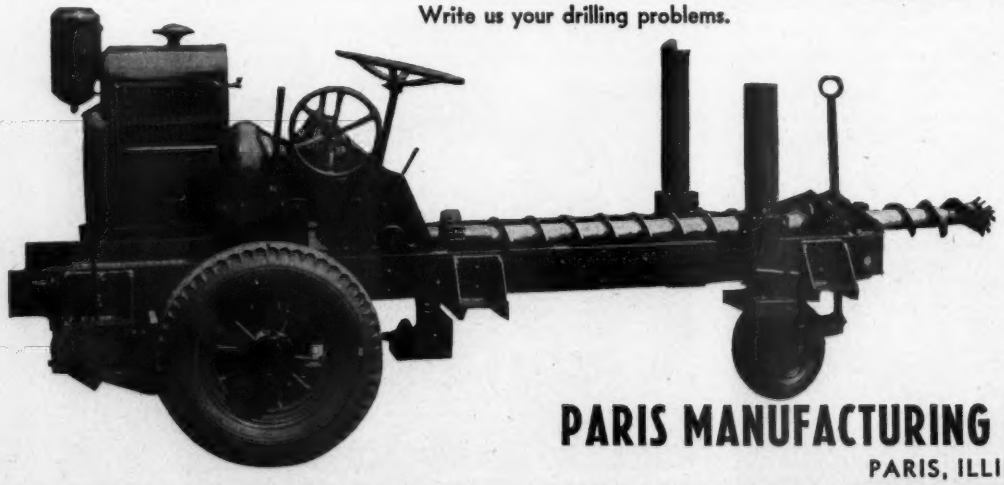

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Western States

CALIFORNIA

»»» The Maritime "M" has been awarded the Phelps Dodge Copper Products Corporation, Los Angeles Tube Division, according to Wylie Brown, president of the corporation. The award was announced by Admiral H. L. Vickery, Chairman of the United States Maritime Commission Board of Production Awards, is "in recognition of outstanding production achievement." The award is of the Maritime "M" pennant and the Victory Fleet Flag. In addition the Maritime Commission has awarded individual merit badges to all employes of the Los Angeles Tube Division of the corporation. Recently this plant received the Army-Navy "E" award. Only a limited number of plants in the United States have received both the Maritime "M" and the Army-Navy "E," it was pointed out.

»»» Following its recent action advocating gold as the international monetary standard, the San Francisco Chamber of Commerce by two actions is now endeavoring to assure post-war recovery of the gold-mining industry.

In one resolution the chamber is seeking amendment of the War Production Board order (L-208) which closed the gold mines, or action by Congress, if necessary, to allow them to operate sufficiently to cover carrying and maintenance expenses. The gold-mining industry is the only industry as such against which a general closing order was issued. It was expected that such an order would free thousands of miners for work in the strategic metals industries, but the desired result was not accomplished inasmuch as only a few hundred gold miners went into the mining of strategic metals. Consequently, the closing order has tended to destroy this industry without any particular benefit to the war effort, it is said.

In a second resolution the chamber proposes that the Reconstruction Finance Corporation be requested to grant secured loans to gold-mining companies to enable them to finance the continued maintenance of their properties in an unwatered and timbered condition until such time as they may lawfully resume production.

Ernest Ingold, president of the San Francisco Chamber, points out that whereas, even in 1942, the average monthly production of gold in California amounted to $2,181,000, it dropped to $547,505 in July of this year. Throughout the United States, production averaged $8,618,120 a month in 1942 and dropped to $3,469,000 in July, 1943. This means that properties worth millions of dollars are now idle.

Many of the properties are owned by companies which had no reason, before the war, according to Mr. Ingold, to build up reserves to carry them through inoperative years. If the mines are not maintained, irreparable damage will be done to small communities throughout the West and to the nation.

For the post-war world economy and employment, developed properties must be in a position to reopen. Therefore, it is claimed, those companies which so desire should be permitted to cover their out-of-pocket expenses by operating by the use of men and materials not essential to the war effort or, those which have measurable ore blocks to use as security, should be permitted to meet their war-period requirements through loans from the RFC.

Borax Plant Wins Army-Navy "E"

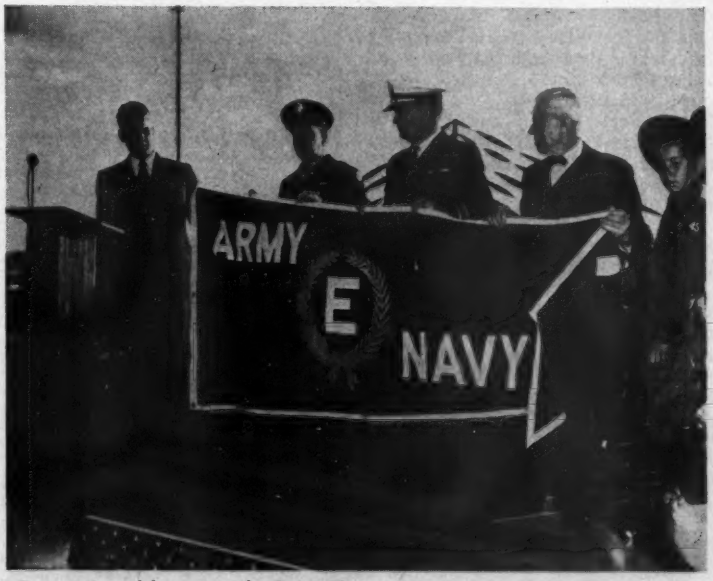
PACIFIC Coast Borax Company, through its president, F. M. Jenifer, announces the award of the Army-Navy "E" to its Baker Mine and Boron Mill.

This is the second California plant of the company to win the coveted award. The company's plant at Wilmington, Calif., is also accorded this recognition.

"It is a matter of great satisfaction to us," Mr. Jenifer said, "to realize that the men and women of our Wilmington and Boron Plants have won the distinguished "E" pennant. While the company has had many occasions to be proud of the attainments of its personnel, there has never been a time in its history when it has had greater satisfaction in its achievements than it has today."

Mr. Jenifer pointed out the very large number of products and processes into which Borax enters in some form or other, not generally realized by the public. These include pharmaceuticals, heat resisting glass, fireproofing, glass wool insulation, magnesium founding, photographic chemicals, chemical manufacturing, electrolytic condensers, steel, flux for aircraft motor bearings, petroleum refining, adhesives, medicinal products, soap and numerous others.

A. B. Campbell, director of sales, acted as master of ceremonies for the occasion.



Presentation of banner to the Boron Plants. Left to right: C. G. Grim, superintendent; Col. J. A. Worrell, C.O. Los Angeles Medical Depot; Lt. Comdr. E. F. Keyes, USNR; Edward Regan, oldest employe

NEVADA

››› Development of strategic minerals is attracting interest in the Goldfield area, particularly in the Goldpoint and Coaldale sectors. Gold mining has practically come to a standstill in the vicinity of this famous old camp. An extensive scheelite deposit has been uncovered by a bulldozer in the Goldpoint section on the DeVotie-Wiley property, which has been optioned by Hawthorne operators, and ore tested is said to contain commercial tungsten.

COLORADO

››› The Department of the Interior has been granted an easement by the United States District Court of Colorado to construct a main tunnel 11,326 ft. in length and two laterals totaling 5,856 ft. to drain the rich Leadville mining district of Colorado, permit the reopening of scores of flooded mines, and clear the way for possible production of 3,000,000 tons of zinc-lead ores and 1,000,000 tons of manganese ores for the war, Secretary of the Interior Harold L. Ickes announced today. Mining in this group has been at a virtual standstill since 1933 due to the flooding of workings.

The mine draining project is undertaken by the Bureau of Mines pursuant to a specific act of the Congress appropriating funds for this tunnel, upon endorsement of two units of the War Production Board, the Reconstruction Finance Corporation and other agencies and after review by the Comptroller General, at the request of the Interior Department.

The Leadville tunnel, to be driven under the direction of the Bureau of Mines, will extend from the vicinity of the East Fork of the Arkansas River to the Pyrenees Shaft, one of the flooded mines. From the Pyrenees Shaft to the Tucson Shaft a 2,413-ft. lateral is planned. Also branching from the main tunnel will be a 3,443-ft. lateral to the Penrose Shaft.

While the Congress has appropriated $1,400,000 for the drainage project, opening of the flooded region is expected to result in the ultimate recovery of ores containing metals variously valued at $200,000,000.

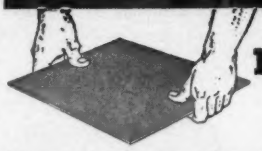
It has been estimated that the 4,000,000 tons of essential ores that can be brought into production by drainage of the area through the tunnel and laterals and by the maintenance of privately-operated minor pumping projects will include 2,000,000 tons of sulfide ores containing 15 percent zinc and 3 percent lead, 1,000,000 tons of carbonate ores averaging 14 percent zinc, and 1,000,000 tons of manganese ore averaging 16 percent manganese.

The permanent tunnel will serve four principal areas which, in the past, have produced more than two-thirds of the ores mined in the Leadville area. These are the Carbonate Hill, Downtown, Fryer Hill, and Iron Hill—names well known to many mining men throughout the nation. Before water began flooding the workings they turned out nearly $15,000,000 in lead and silver values annually. In years past the region has produced gold, silver, zinc, lead, copper, manganese, and manganese-iron fluxing ores valued at nearly half a billion dollars.

WASHINGTON

››› Northwest Mining Association held a two-day meeting at the Davenport Hotel, Spokane, Wash., on December 3 and 4.

This meeting took the place of the annual conference. Speakers were all connected with the mining industry, executives, operators, engineers, and geologists from the Inland Empire, Montana and British Columbia. In addition to the regular program, there was an open forum to allow a friendly expression of opinions.



LOWER YOUR CEILING ON MUCKING COSTS

The more you save in mucking, the lower your mining costs. Gardner-Denver GD-9 Mine Car Loaders are designed in every detail to give you greater savings; for example—

SAVE MORE TIME In the production of vital minerals and metals, Gardner-Denver Mine Car Loaders are helping to speed up the operating cycle—from drilling, through blasting and mucking, to drilling again. That's because the GD-9 Loader is equipped with two powerful five-cylinder radial air motors to provide plenty of power for crowding into the stubborn muck pile and a full dipper at every bite.

SAVE MORE EFFORT The Gardner-Denver fulcrum principle accelerates the dipper as it nears discharge position—enabling the GD-9 Loader to fill *completely* every size of mine car. There is no effort wasted on hauling partly loaded cars—no necessity to fill them by hand mucking.

SAVE ON MAINTENANCE Vital operating parts of the Gardner-Denver Mine Car Loader run in a bath of oil—sealed against the entrance of dirt and water—the enemies of low maintenance underground. For further resistance to wear—alloy steels are used throughout, heat-treated or hardened where necessary for extra strength and toughness.

For complete information on Gardner-Denver Mine Car Loaders, write Gardner-Denver Company, Quincy, Illinois

GARDNER-DENVER *Since 1859*

NEW MEXICO

››› Recognition for outstanding achievements in the war production program was made recently by Under-secretary of War Robert P. Patterson in a letter to the employes of the Potash Company of America at Carlsbad, N. Mex. Mr. Patterson's letter follows:

"9 November, 1943.

"To the Men and Women
of the Potash Company of
America, Carlsbad, N. Mex.

"I am pleased to inform you that you have won for the second time the Army-Navy Production Award for meritorious services on the production front.

"You have continued to maintain the high standard that you set for yourselves and which won you distinction more than six months ago. You may well be proud of your achievements.

"The White Star, which the renewal adds to your Army-Navy Production Award flag, is the symbol of appreciation from our Armed Forces for your continued and determined effort and patriotism."

On April 7, The Potash Company of America received the Army-Navy "E" award—the first to be given in the State of New Mexico.

››› The Shattuck Denn Mining Corporation of New York has announced the closing of a deal with the Peerless Oil & Gas Company for an operating interest in the Navajo Fluorspar Mines, the Frank McDonough fluorspar mill at Grants and the Zuni Milling Company's fluorspar mill at Los Lunas.

››› Dispute as to union representation between the C. I. O. and A. F. of L. as a bargaining agency with Chino Mines Division, Kennecott Copper Corporation, operating at Hurley and Santa Rita, was settled November 10 when the National Labor Relations Board ruled that the C. I. O. International Union of Mine, Mill and Smelter Workers Locals 63 and 69 had been designated as the bargaining agency for machinists and helpers. The designation followed a close election held July 12 in which the C. I. O. won over the International Association of Machinists by a vote of 41 to 34.

UTAH

››› Post-war rehabilitation and operating encouragement for the metal mining industry is sought in a resolution adopted last week by the board of governors of the Salt Lake City Chamber of Commerce.

The resolution is designed to support principles of a bill sponsored by Senator Scrugham of Nevada, providing for the freezing by the Government of metals on hand after the war and the creation of a stockpile as insurance against any future emergency.

Most of the mines producing ores for the war program have greatly depleted available ore reserves in an effort to meet the armament demands. If, after present hostilities cease, the armed services flood the market with metal on hand, it would result in a closing down of operating mines. Prospecting and development would be discouraged and widespread unemployment would follow.

On the other hand, it is pointed out, acquisition of a stockpile of metals would be an investment for the people of the United States, which would not deteriorate, and which would be an insurance policy against future acts of aggression.

››› Possibility of some relief for the critical labor shortage in Utah mines was seen in the announcement last week of the closing of the Salt Lake City plant of the Remington Arms Company on December 31.

Closing of the Remington plant, which has been manufacturing small

SUPPLY YOUR SHOT-FIRERS
BAGS TO TAMP WITH

and they will do a better job of bringing down coal. They can seal their shots easier, quicker and better—getting the ultimate in shot-control with a greater degree of safety. Mines now using SEALTITE TAMPING BAGS have decreased tamping time and powder costs by increasing tonnage with more effective shooting.

We are prepared to serve more mines with SEALTITE TAMPING BAGS. Leading mine-supply Distributors can give complete service information—or write us direct.

SEALTITE TAMPING BAGS

TAMPING BAG COMPANY
MT. VERNON, ILLINOIS

arms ammunition for the past one and one-half years, will release approximately 10,000 workers, 4,000 of which are men. While many will find employment in other war plants in this area, some have already entered the mines, mills and smelters.

IDAHO

»»» Bunker Hill & Sullivan M. & C. Company has declared its fourth quarterly 25-cent dividend for 1943, payable December 1 to stockholders of record November 10, and totaling $327,000. This payment brings the company's total dividend disbursements for the year to $1,308,000, the same as for last year, and the grand total to $58,587,241. While the Bunker Hill is the oldest producing mine in the Coeur d'Alene district, it is the youngest in point of deep development. The Bunker Hill's deepest workings are at the 2,300-ft. level as compared with 3,700-ft. at the Sunshine and 4,650-ft. at the Morning mine.

In speaking of mine development, Stanly A. Easton, president of Bunker Hill, says: "The Bunker Hill mine exploration resulted in finding good new ore in quantity at several points. The Emery vein, extensively mined on the 2,100 level, has been cut 400 ft. lower, on the 2,300 (bottom) level of the mine and shows very well, both as to grade and quantity with good promise for further deeper mine development. An important find of new ore on the 1,300 level was made in an area of the mine not heretofore prospected. Westward mining on the 2,100 level continues to disclose new ore of importance. This ore will shortly be found on the 2,300 level by further crosscutting there." The company has recently installed a sink-and-float unit to handle the entire product of the mine, about 1,800 tons per day.

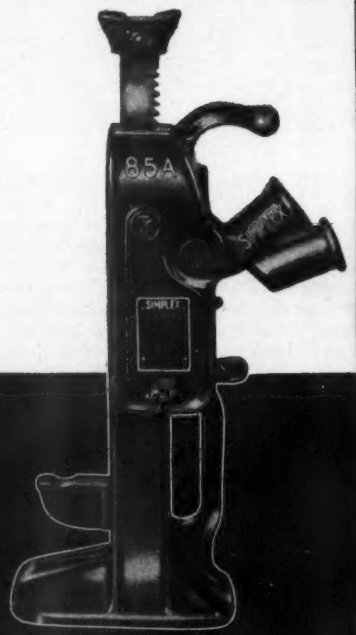
»»» Hecla Mining Company has announced that it will pay its fourth quarterly dividend of 25 cents a share for 1943 on December 10 to shareholders of record on November 10. Amount of the current dividend is $250,000, bringing the total amount paid this year to an even $1,000,000 and the grand total to date to $27,-155,000.

While the Hecla mine itself is believed to be nearing the end of its productive life, the company has invested in other mining and industrial enterprises that will continue its earning capacity. The Hecla now owns, in equal partnership with the Bunker Hill, a half interest in the Star mine, rated as the largest zinc-lead mine in the state, and an equal half interest with the same Bunker Hill organization in the $3,050,000 Sullivan zinc plant at Kellogg, which is producing at capacity, 3,500 tons of slab zinc 99.99+ pure and 36,000 lbs. of cadmium per month. Other rich holdings of the Hecla include control of the Polaris Mining Company, which owns the bulk of the rich Chester vein recently developed at a depth of 2,700 ft., and considered the greatest discovery of lead-silver ore in any district in recent years; ownership of a huge tailings dump at Osburn estimated to contain 2,000,000 tons of profitable zinc-lead mill feed, and on which the company has erected and equipped a 1,000-ton complete milling plant; lease on the Silver Cable mine, near Mullan, Idaho, which is now producing 80 tons per day of zinc-lead ore from a developed ore body 4 to 12 ft. wide and 800 ft. long; ownership of a third interest in the Resurrection mine in Colorado and a new zinc development in California.

»»» Trucks have made it possible to operate many mines in the Coeur d'Alene district which could not be operated in former years. Trucks

Simplex Spells Safety When It Comes to Mine Jacks

A size for seams of any thickness:
84A, 14" high, 7" lift
85A, 17" high, 10" lift
86A, 20" high, 13" lift.
Toe lift on all sizes lifts from a minimum of 1¾". 5-tons capacity.



Since 1899 Simplex Jacks have proved highly effective ordnance in the ceaseless war against mine accidents. Every construction detail of Simplex Automatic Lowering Mine Jacks is a true safety feature; including alloy steel drop forged heat-treated parts, precision machining, unbreakable trunnions and unbendable foundation. It pays to have a Simplex Jack handy on every coal cutter, loader and locomotive.

Templeton, Kenly & Co., Chicago (44), Ill.
California, Pa. Princeton, W. Va.
Better, Safer Mine Jacks Since 1899

Simplex
LEVER · SCREW · HYDRAULIC
Jacks

The Gold Hunter mill at Mullan has a capacity of 500 tons per day, producing lead and silver concentrates

are now hauling in excess of 5,000 tons per day from semi-isolated mines to custom plants and other mills throughout the district. Most of these new mines are at high altitude where snow conditions have formerly been an A No. 1 hazard. All of the operating companies now have bulldozers to keep the roads open and production continues the year around. Snowfall to depths of 10 and 12 ft. are common obstacles.

»»» The Lucky Friday mine at Mullan, Idaho, is one of the outstanding mining developments in the Coeur d'Alene district in recent years. Located just outside the city limits of Mullan, the property has been ignored by mining men and geologists since its location over 50 years ago. Since the beginning of the present development work in 1939, the Lucky Friday Silver-Lead Mining Company, made up almost entirely of local stockholders, has shipped ore for which the company has received net smelter returns of $118,608.56, not counting premium payments on the last three shipments. The last shipment to the Bunker Hill smelter netted the company $11,420.41 for 30 tons of lead concentrates and 24 tons of zinc concentrates. The car of lead ore assayed 476.3 oz. silver, 25.55 percent lead and 10 percent copper. The zinc car assayed 54.35 percent zinc and 23.35 oz. in silver per ton.

The property has paid its own purchase price of $15,000 and the cost of all equipment and development. The ore has been produced as needed from a shoot adjacent to the development shaft, which has been sunk to the 600 level. The company is now engaged in sinking this shaft an additional 200 ft. to the 800 level, where it is planned to do considerable prospecting of the mineralized zone.

»»» Mining engineers, including Walter H. Hill, veteran geologist of Grangeville, Idaho, Philip J. Shenon, head of the regional office of the U. S. Geological Survey, and Dr. J. H. Mackin, of the University of Washington, report the finding of magnetic iron ore deposits estimated in millions of tons in a semi-isolated district about 12 miles from Grangeville. "The iron is exceptionally high grade magnetite," says Mr. Hill, "and contains no sulphur, titanium or phosphorus, but it does include enough manganese, 2 to 3 percent, to rank it in equality with Swedish iron of which armor plate is made."

Estimates of tonnage have been made from surface outcrops by Lyle E. Schafer, of the United States Bureau of Mines and S. H. Lorrain, district engineer. It is stated plans are in prospect to diamond drill the deposits under direction of the U. S. Bureau of Mines.

»»» Federal Mining & Smelting Company now has a string of trucks engaged in hauling low grade mill feed from its No. 5 tunnel dump to the Morning mill in order to keep the mill operating through the labor depression that has handicapped the Coeur d'Alene district for over a year. The Federal has already milled out all the available mill feed in its No. 6 dump. The company has plenty of reserve ore in the mine but lacks the manpower to produce it. For many years the company's Morning mine has been listed by the U. S. Bureau of Mines as the largest single zinc producer in the United States. The Morning mine adjoins the Hecla Company's Star mine and is a part of that great ore body.

ALASKA

The Baker Island molybdenite deposit, southeastern Alaska, was examined during the summer of 1943 as a part of the war-minerals investigations of the Geological Survey. The deposit is on the east coast of Baker Island, one of the large islands off the west coast of Prince of Wales Island.

The large molybdenite mineralization is localized in an area of silicified granite and hornblende granite, which is cut by many quartz veinlets. The molybdenite occurs in the quartz veinlets and also may be disseminated in the granites. Most of the quartz veinlets occupy joints that trend N. 65° W., but some occupy more northward-trending joints.

BOOK REVIEWS

MECHANICAL LOADING OF COAL UNDERGROUND, *by Ivan A. Given, "Coal Age." The McGraw-Hill Book Co., 330 West 42nd St., New York City. Price* $4.00. 397 *pages.*

This is a very complete treatise on mechanized coal mining, starting with a brief history of the earlier operations and tracing the course of the development through to the present day. Following a discussion of the factors affecting mechanized loading there is a detailed outline of machine loading essentials, such as management, engineering, crews, and auxiliary operations which affect the loading performance. The book then goes into considerable detail describing mining systems with all types of equipment—scrapers, hand-loaded and self-loaded conveyors, and mobile loading machines; operating in all classes of seams—level, pitching, thick and thin veins in both bituminous and anthracite mining. The completeness of these descriptions, together with more than 200 illustrations, makes this publication a valuable addition to the library of mining men.

G. B. Southward

STUDIES IN ARC WELDING—DESIGN, MANUFACTURE AND CONSTRUCTION. *First edition, published by the James F. Lincoln Arc Welding Foundation, Cleveland, Ohio.*

This volume contains 98 pages on arc welding, submitted by trained technicians and engineers in the James F. Lincoln Arc Welding Foundation's 1940-42 Industrial Progress Award Program. They have been edited and published in a comprehensive manner and the book represents the complete collection of design studies on arc welding published since the Foundation's first volume was issued in 1939. It has over 1,000 illustrations and is bound in semi-flexible simulated leather, 6 by 9 in., with 1,295 pages.

Manufacturers Forum

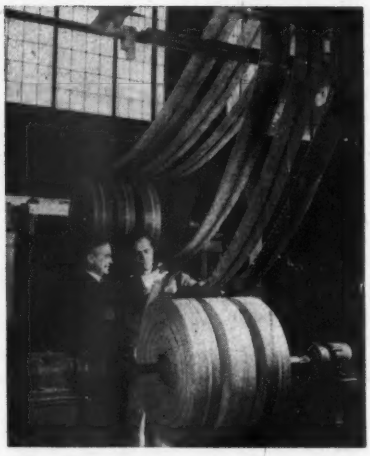
Third Army-Navy "E" Star for Exide

First plant in the Philadelphia area to win the All-Navy "E" Award in March, 1941, the manufacturers of Exide Batteries now have the distinction of being one of the few concerns in the country to receive a third star for its Army-Navy "E" pennant.

In advising R. C. Norberg, president of The Electric Storage Battery Company, makers of Exide Batteries, of the award, Admiral C. C. Bloch, chairman of the Navy Board for Production Awards writes:

"The men and women of your plant have continued to maintain the high standards they set for themselves when they were originally awarded the Army-Navy "E". They may well be proud of their achievement.

"The additional white star, which the renewal adds to your Army-Navy Production Award flag, is the symbol of appreciation from our armed forces for your continued and determined effort and support so necessary for victory."



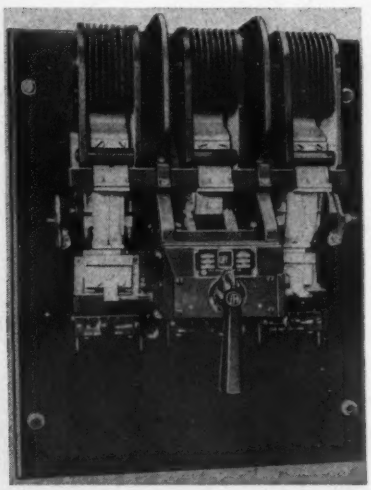
Synthetic rubber belting produced by the United States Rubber Company is being manufactured to replace natural rubber belting

New Air Circuit Breaker

A new trip-free air circuit breaker, known as Type KC, with an interrupting rating of 50,000 rms amperes, is offered by the I-T-E Circuit Breaker Co., Philadelphia, Pa. Ratings are 600 volts a-c, 250 volts d-c, 100 to 1600 amperes. Operation may be either manual or electric; one, two, and three pole styles are offered. Mounting may be on open type (live front) or dead-front switchboards or in individual steel enclosures of general purpose or weatherproof construction.

Construction features include silver-alloy main contacts brazed to solid-copper contact blocks, auxiliary and arcing contacts which are also made of silver-alloy and magnetic arc chutes with blowout coils and iron vanes. Manual operation makes use of a large, pistol-grip handle which requires turning only ninety degrees to open or close the breaker. Electrically operated breakers are provided with a unit-type solenoid mechanism and a trip-free closing relay.

The attached illustration shows a manually operated type KC circuit breaker. A complete description is given in Bulletin 1301, which may be obtained from the company upon request.



AO Safety Promotion Services Free to Industry

To assist in the current campaign against industrial eye accidents, American Optical Company of Southbridge, Mass., manufacturers of industrial safety equipment, announces it is now making available to industry the following free AO safety promotion services:

1. Safety posters dramatizing the importance of wearing safety goggles on eye-hazardous jobs.
2. A miniature newspaper—*The Safety Clipper*—published periodically and containing material on eye safety designed for reproduction in employe magazines or newspapers.
3. Analyses of plant eye hazards, and recommendations by trained AO safety representatives for effective eye protection programs.
4. A 16-mm. sound training film titled "Right On the Nose" and demonstrating the simplest, quickest methods of fitting non-prescription safety goggles so that workers can wear them in comfort. Also available is a booklet bearing the same title and providing in printed form the information contained in the film.

American Optical Company safety representatives will be glad to arrange for any of the above services. Or write the concern direct at Southbridge, Mass.

Manhattan Receives Army-Navy "E" on Golden Anniversary

On October 28, The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc., Passaic, N. J., one of the largest manufacturers of industrial rubber goods in the United States, observed its golden anniversary and, appropriately enough, received its Army-Navy "E" for excellence in production on that day. No special anniversary ceremonies were held because War Department rules forbid any other observances on the day the "E" award is received.

First to receive a Treasury "T" flag for bond sales in the Passaic area, first in the industrial scrap drive, too, it has added another first in receiving its Army-Navy "E" before any other firm in Passaic.

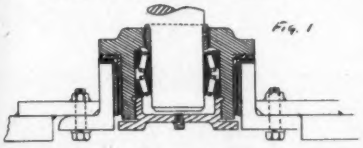
New Journal Box and Bearing Design for Mining Locomotives

Ease of accessibility and maintenance are features of the design shown which was worked out by Westing-

house and Whitcomb locomotive engineers.

Points of importance are:

1. The back of the box at the axle fit is equipped with a steel labyrinth which effectively excludes extraneous matter and retains the lubricant within the box.
2. The anti-friction bearing is of the double row roller type amply designed for the size of locomotive to which it is applied.
3. The journal box cover is of the screw type, which makes bearing adjustments very simple. The inside circumference of the cover bears on the outer bearing race. Any necessary adjustment is made by turning the cover. The cover can then be locked in the proper position by means of a notched device on the outside of the cover.
4. The bearing is lubricated by means of a grease fitting in the cover. The cover is recessed so that the outer edges protect the fitting.
5. The journal box is equipped with renewable wearing plates. These plates take the wear and indefinitely extend the life of the box.
6. The sketch shows the ease with which the complete journal box may be removed from the axle without dropping the truck. The pedestal jaws, which are equipped with renewable wearing plates, are bolted to a side frame extension. Removal of the pedestal jaws provides ample space for pulling the box.



This construction will appeal to the operator who appreciates the importance of good design, quick inspection, low maintenance and long life. New Westinghouse mining locomotives utilize the new journal box and bearing.

Repair of Worn Tractor Shoes

To aid tractor owners overhauling their equipment, and to avoid the difficulty in securing new repair parts, or the delay ensued in waiting for delivery of such parts, the Allied Steel Products, Inc., Cleveland, Ohio, offers its Bulldog brand tractor grip-lugs.

Worn grousers on tractor-shoes cause tracks to slip and slide over the terrain with resultant loss in tractor efficiency.

It is now unnecessary to tear down the track assembly and replace the worn grouser-shoes with new parts, when a simple repair operation will restore the "gripping power" of the track. This is accomplished merely by welding on to the old grouser-shoe a specially designed steel bar, with a groove and bevel to facilitate laying welding bead along the edge which holds the bar and the grouser-shoe together as in a vise. The material is said to be a special analysis work hardening steel which gets harder and tougher with use, and often outlasts the oirginal grouser.

$600 Cash Prizes Awarded in Metallizing Contest

Cash prizes have just been awarded by the Metallizing Engineering Co., Inc., Long Island City, N. Y., in the first of its new series of Conservation Contests. Open to users of any type metal spraying equipment, these contests are intended to show manufacturers and others how they can save critical metals and time in production and maintenance.

First prize of $200 was awarded to R. C. Overstreet, Tinnerman Products, Inc., Cleveland, Ohio, for his description of a faster, more durable way to protect speed nuts against corrosion. Second prize, $100 in cash, went to L. W. Sagle, Baltimore & Ohio Railroad Co., Baltimore, Md., for procedures showing how replacements are avoided and worn parts reclaimed quickly and cheaply.

Additional prizes were awarded for data on—Economies afforded in building up an undersize rudder stock for a dredge; a method of salvaging discarded press rams; the utilization of metallized cast iron instead of nickel-chrome steel in the Gasogene unit; the replacement of solid aluminum for radio transmitter frames by copper and zinc coatings on steel, and a method of applying sprayed aluminum on steel magnet inserts.

A special prize of $25 went to T. Horn, Crescent Operations, Anniston, Ala., for information showing how an old bus engine was converted into an auxiliary air compressor used in the operation of this company's metallizing equipment.

Two Canadian entries each won $25 for wartime maintenance short cuts.

Safety Door Interlock Switch

A new door interlock switch, designed as an emergency device to interrupt control circuits where access doors are opened when the power is on, has been announced by the Specialty Division of the General Electric Electronics Department, at Schenectady, N. Y.

It has a carrying capacity of 10 amp, 110 or 220 volts a-c or d-c, and an emergency opening capacity of a-c 7½ amp, 110 or 220 volts; d-c on low inductive circuits, 5 amp, 125 volts; 2½ amp, 250 volts.

Application covers a wide range where doors, windows, or covers must be interlocked for the protection of the equipment and safety of the personnel. For example, doors on burglar alarms and signal controls for fire doors.

SECOND STAR TO PHILCO STORAGE BATTERY DIVISION

Betsy Ross of Trenton, N. J., a purchase expeditor at Philco who is related to the Colonial lady who made the first American flag, maintains an illustrious tradition as she sews the second star on the "E" flag of the Storage Battery Division of Philco Corporation, which was awarded by the Army and Navy for continued "meritorious services on the production front." Cornelius F. Bradley (left), president Local 108, U.E.R.M.W.A., and M. W. Heinritz, vice president in charge of the Storage Battery Division, are preparing to raise the flag as soon as the modern Betsy Ross has finished her work. The original "E" presentation was made to Philco on October 7, 1942

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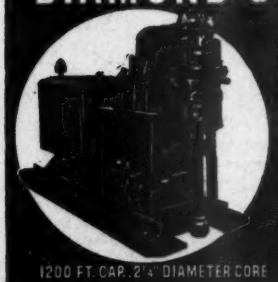
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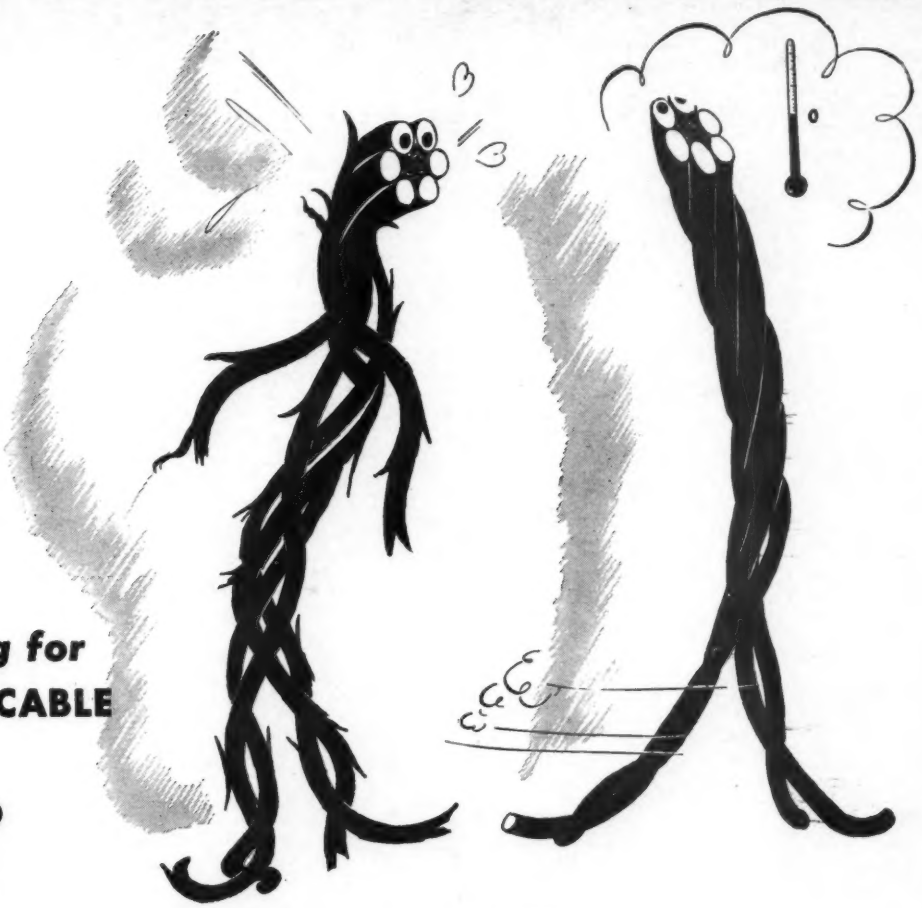

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